MARINE REVIEW.

VOL. XIII. CLEVELAND, O., JANUARY 2, 1896. No. 1.

Facts About the Lake Grain Trade.

It is, of course, well known that Buffalo is the great terminal point on the lakes for the shipping of grain and flour to the seaboard. Buffalo's grain receipts is indicative of the grain business or the entire lakes. Shipments through the Welland canal and by way of Georgian bay ports, Port Huron and Sarnia are quite important, and there is also some grain forwarded to the seaboard by way of Erie, Fairport and a few other places on Lake Erie, but the great bulk of the business, probably 80 or 85 per cent. passes through Buffalo elevators. Correct statistics as to receipts at Buffalo are, therefore, interesting.

During the season of 1895 there was received at Buffalo by lake 162,988,482 bushels of grain, including flour as wheat. This aggregate is full 2,000,000 bushels more than was received in 1894 but it is nearly 25,000,000 bushels less than the receipts of 1893. Receipts of grain and flour at Buffalo during the past three years were as follows:

	1895.	1894.	1893.
Flour, barrels	9,289,636	11,630,620	10,566,670
Wheat, bushels	46,297,200	50,224,588	68,267,484
Corn, bushels	37,166,012	28,675,571	39,982,814
Oats, bushels	21,547,748	14,830,596	19,784,939
Barley, bushels	10,745,212	8,627,546	5,787,640
Rye, bushels	784,400	456,694	578,933
Total bushels	116,540,572	102,814,995	134,401,810
Flour equivalent in wheat, bushels	46,448,170	58,153,100	52,833,350
Grand total, bushels	162,988,842	160,968,095	187,235,160

In 1836 the receipts of grain of all kinds at Buffalo, including flour as wheat, were 1,239,350 bushels; in 1845, 5,581,790 bushels; in 1855, 24,472,278 bushels; in 1865, 51,415,183 bushels; in 1875, 57,967,631 bushels; in 1885, 64,091,681 bushels, and in 1895, 162,988,742 bushels.

The movement of grain of all kinds out of Chicago during 1895 was 14,859,183 bushels in excess of 1894, but there was a decrease of full 50 per cent. in flour shipments. Chicago's grain business is shown by the following table:

CHICAGO GRAIN SHIPMENTS SEASONS OF 1894 AND 1895.

	1895.	1894.
Wheat, bushels	13,158,422	15,016,804
Corn, bushels	47,701,850	37,148,717
Oats, bushels	17,674,346	13,913,761
Barley, bushels	5,243,531	2,868,060
Rye, bushels	57,000	28,624
Total, bushels	83,835,149	68,975,966
Flour, barrels	787,512	1,630,345

The entire grain and flour business of Lake Supcrior, about 98 per cent. of which was east-bound, is best shown by the records of the two canals at the Sault. The canal figures in this regard for 1894 and 1895 follow:

	United States and Canadian canal, 1895.	United States canal, 1894.
Wheat, bushels	46,218,250	34,869,483
Grain other than wheat, bushels	8,328,694	1,545,008
Flour, barrels	8,902,302	8,965,773

It will be seen from the foregoing figures that while there is a falling off in Lake Superior flour shipments of 63,471 barrels as compared with 1894, the shipments of wheat during 1895 were 11,348,767 bushels, or 33 per cent, in excess of shipments during 1894. As regards the item of "grain other than wheat" it must be explained that the 1895 figures include such east-bound grain as was heretofore reported in the item of unclassified freight; hence the large increase in 1895.

In past years quite a large quantity of wheat was shipped by lake from Toledo to Buffalo, but in 1895 the receipts of wheat at Toledo by lake from northwestern districts exceeded the shipments. Receipts in 1895 aggregated 2,596,623 bushels, while the shipments were only 2,314,484 bushels. In 1894 shipments footed up 12,734,578 bushels.

Shipments of wheat from Fort William and Port Arthur during the 1895 season of navigation aggregated 8,619,951 bushels against 9,001,397 bushels in 1894. When navigation closed at Port Arthur and Fort William in 1895 there was in store at those points 1,667,781 bushels of wheat, as compared with 545,168 bushels at the close of navigation in 1894.

Increasing Interest in the Dam Project.

Senator Brice has opened up a correspondence with leading engineers throughout the country, who have for several years past advocated the construction of a dam in Niagara river, and he was fortified with a vast collection of information on this subject before bringing it up in the senate. The men whose opinions have been sought by Mr. Brice are in most cases well-known authorities on hydraulic engineering, who have for a long time past contended that the army engineer corps was wrong in not taking up this method of improving the draft of water on the lakes. It is needless to say, therefore, that they will oppose, as far as possible, legislation intended to entrust any work that may be undertaken now to the army engineers. They will try to have investigations as to the feasibility of the project entrusted to the Deep Waterways Commission, recently appointed by President Cleveland, or to a board having simply representation from the army corps. The ground taken by those who have all along advocated this project is thus outlined:

First—Have an examination made at once to determine the correct outflow at Niagara, the character of the lake bottom at probable locality for the construction of the dam, and a careful examination of the physical condition at all of the lake harbors, both American and Canadian, relative to the proper level at which the lake surface may be regulated without excessive damage to private property. This examination should be made between low water in early spring and high water in June.

Second—Plans and estimates of cost should be based on this investigation and submitted in time for congressional action at the second session of the present congress.

Third—If the plans are deemed feasible and satisfactory bids should be asked for from contracting engineers to construct the dam, either on the plans already submitted or else on new plans to be submitted by the contracting engineers, such contractor to guarantee to construct a dam which will give the result required, on the principle of "no cure no pay."

In the house of representatives, Mr. Griswold of Erie has succeeded in getting a resolution on this subject before a sub-committee of the committee on rivers and harbors. The resolution calls upon the secretary of war for "information respecting the advisability of increasing the depth of the great lakes by means of dams at outlets." The sub-committee consists of Representatives Cooper of Wisconsin, Towne of Minnesota and Clark of Alabama. When these gentlemen, two of whom are from lake states, are informed of the interest that has developed in this matter on the lakes, they will undoubtedly recommend the passage of the resolution.

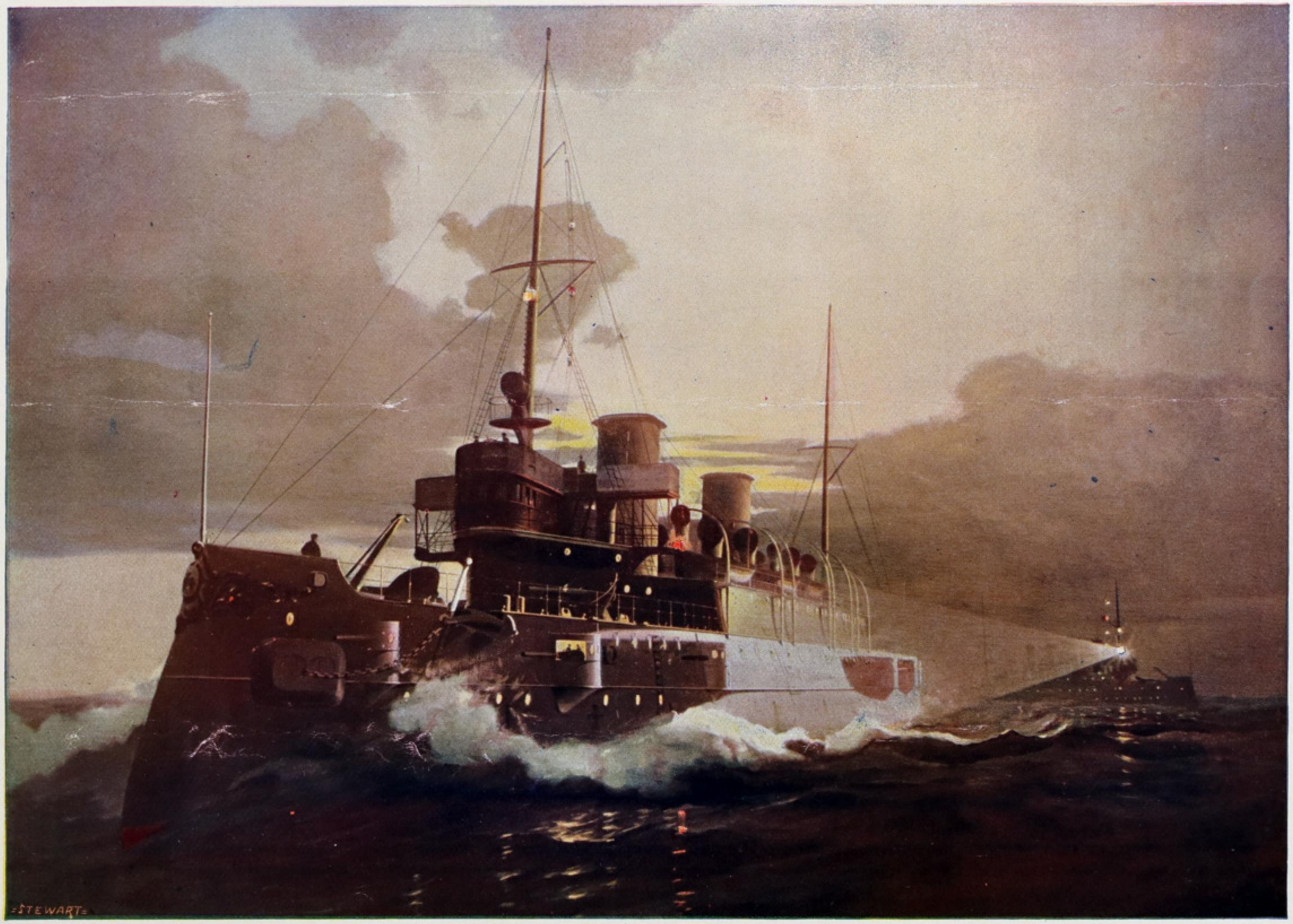
Progress with the Chicago Drainage Canal.

Reports recently submitted to the trustees of the Sanitary District of Chicago show that work on the big drainage canal to date amounts to over 75 per cent. of the whole. During the months of August, September and October last, there was over 8,700 men at work on the canal. The report of Chief of Engineers Randolph shows that the value of the regular and collateral work done in the period between Jan. 1 and Dec. 1, 1895, eleven months, is $6,036,400. The volume of work done in this period is as follows: Glacial drift, 7,187,600 cubic yards; solid rock, 4,824,000 cubic yards; retaining wall, 95,000 cubic yards.

The total volume of work accomplished since the inception of the canal project is as follows: Glacial drift, 20,172,686 cubic yards; solid rock, 10,212,751 cubic yards; retaining wall, 97,600 cubic yards. The value of this work on regular and collateral contracts is $14,456,600, or 76.20 per cent. of the entire work done upon a basis of existing contracts. The percentage of work done on Jan. 1, 1895, was 44.38, so the percentage of work done in the first eleven months of 1895 amounts to 31.52, or within 12.56 per cent. of the total work done in 1892, 1893 and 1894.

Marine engineers of Cleveland elected the following officers at their annual meeting, held a few days ago: President, John N. Kirby; vice president, John Hayward; treasurer, M. B. Sturtevant; corresponding secretary, W. C. Clark; recording secretary, William Most; financial secretary, James L. Sanderson; chaplain, L. A. Weeks; doorkeepers, H. A. Burton and George Allen; trustees, M. B. Sturtevant, William Kennedy and H. McAuley.

New officers of the Cleveland lodge, Ship Masters' Association, are as follows: Joseph A. Holmes, president; Richard Neville, first vice president; William Cumming, second vice president; Thomas Jones, treasurer; W. W. Brown, financial secretary; Robert C. Pringle, recording secretary.



SUPPLEMENT TO MARINE REVIEW,
VOL. 13, NO. 1, JAN. 2, 1896.

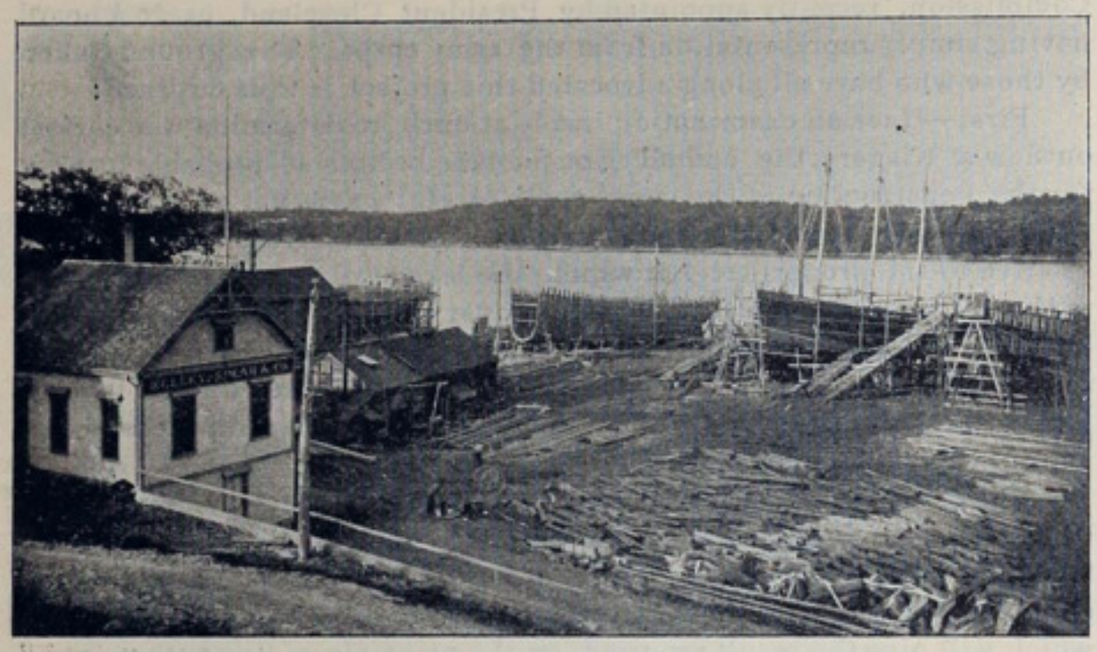
BUILT BY WM. CRAMP & SONS SHIP AND ENGINE BUILDING CO.

U. S. CRUISER MINNEAPOLIS—FASTEST WAR SHIP IN THE WORLD—23.073 KNOTS PER HOUR.

Flint & Pere Marquette Car Ferry.

As announced in the last issue of the REVIEW, F. W. Wheeler & Co. of West Bay City are to build the big $300,000 steel car ferry, upon which the Flint & Pere Marquette Railway Co. have been figuring for some time past. This vessel will run exclusively on Lake Michigan between Manitowoc and Ludington and will be in every way fitted for winter as well as summer service. Wheeler & Co. now have under contract six steel steem vessels, and two steel tow barges, valued in all at $1,670,000.

The length of this car ferry between perpendiculars will be 331 feet, her over all length 350 feet, beam 56 feet, depth below main deck 19½ feet, depth from upper deck to floor 37 feet. The steel frames and plating will extend from bilge to upper deck, and the main and upper decks also are to be of steel. In preparing the plans for the craft particular attention was devoted to the matter of strength. This is evidenced by the fact that 2,700 tons of steel will be used in her construction. The bow of the new steamer is to be double-plated with ¾-inch plates for a distance of 30 feet abaft the stem, and this double plating will extend 3 feet above the load line. To resist the great pressure of ice shoves, channel beams thoroughly secured both vertically and horizontally will span the hull at close intervals about midway between the floor and main deck. The hull will have six water-tight compartments but no water-bottom.

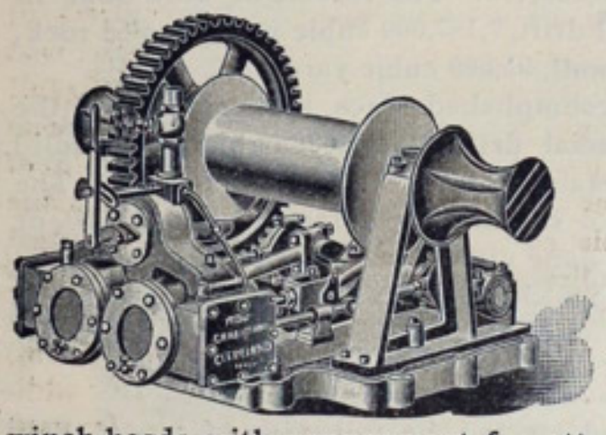


KELLEY & SPEAR'S SHIP YARD, BATH, ME.

A shield of forged steel will afford protection for the rudder, and the shafting of the two after wheels will be housed in as on the Northern line steamers North Land and North West.

The steamer will have three-fore-and aft compound engines of equal power each with 24 and 48-inch cylinders and 36-inch stroke. One of these engines will work the bow wheel, the other two the stern wheels. Steam is to be furnished by four boilers, each 13½ feet in diameter and 12 feet long. The wheels are to be of steel, the two aft of 11 feet and the forward one 9½ feet diameter. The upper works will be of wood. They embrace a cabin with accommodations for twenty-five passengers in connection with the pilot house, texas, etc., and a house abaft the smokestacks to provide quarters for the crew. The steamer will carry thirty loaded cars and 200 tons of coal on a draught not to exceed 13 feet. She is to be completed in October next.

Chase Deck Engine.

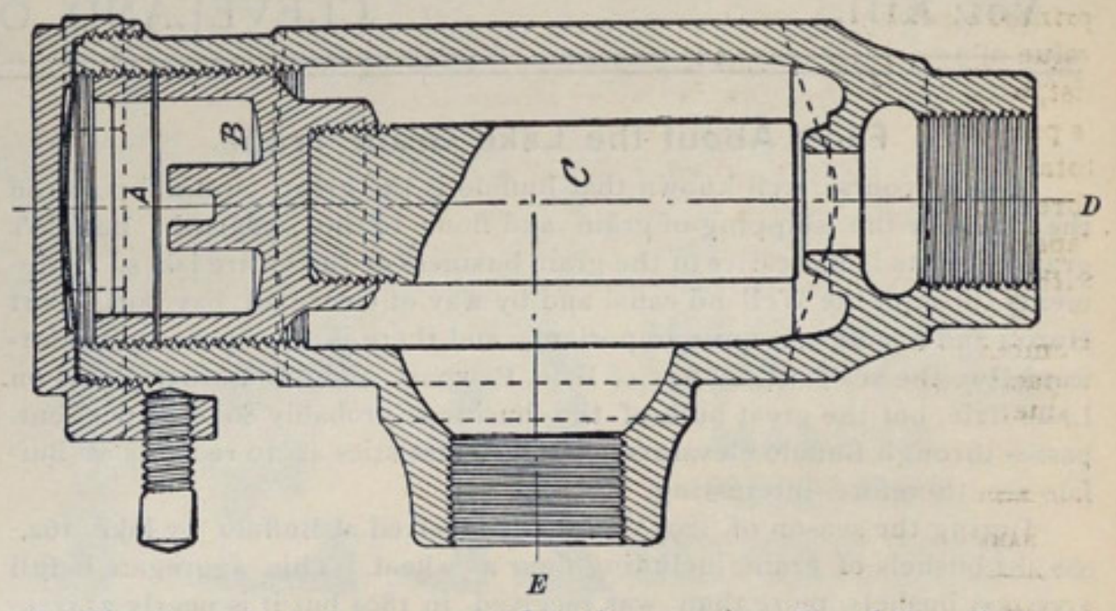


The illustration shows a powerful and well-built deck engine. Since deck engines have become a side issue to so many small shops, it will pay owners to consider advantageous features of this machine. It can be made in 6 by 8, 7 by 8, 8 by 10 and other sizes. The working parts are steel and forged, and there are two winch heads, with arrangement for attaching pump. The lever is reversible and there is no chance of it getting out of order. The sides of the base are raised to form a drip-pan. Fishing concerns will be interested in knowing that this engine with attachments is used for driving and pulling stakes. Other particulars will be furnished by the Chase Machine Co., Cleveland, O.

In preparation for the large amount of work which the Detroit Dry Dock Co. now has on hand, a number of improvements and alterations must be made in parts of its plant. Two slips at the Wyandotte yard will be increased to a length of about 460 feet each.

A Simple Trap.

We illustrate what is called by the makers, for the sake of a name the diamond trap This is a simple and inexpensive device specially, designed for automatically discharging the water of condensation in places where 500 or 1,000 feet of ¼-inch or 1-inch pipe is to be taken care



of. The steam is to be connected to the opening D and the discharge takes place at the outlet E. To adjust the valve for service, steam is first allowed to blow through until the entire valve is thoroughly heated. The head B with the expanding plug C is then screwd down and fastens the plug permanently in position, and the outer cap is then screwed down tightly over all. While the chamber is filled with steam the valve will remain closed, but as the water collects in it, the temperature will fall, the plug C will contract, being made of special material for this service, and the water will flow out until the steam arrives again, when the valve will instantly close. The diamond trap is made by Jenkins Brothers, No. 71 John street, New York.

Miscellaneous Matters.

Capt. M. M. Drake, well known vessel owner, has been appointed commisioner of public works at Buffalo.

Capt. Hursley of Sault Ste. Marie, who bought the schooners Moonlight and Kent, ashore near Marquette, claims that a week of good weather in the spring will be sufficient to release the vessels. He says that no effort was made to release the vessels when wreckers went to them from the Sault recently. He was simply making an examination of their condition.

Capt. Thomas Wilson's steamer W. D. Rees, launched recently by the Cleveland Ship Building Co., is built on the channel system of construction and under the rules and inspection of the United States Standard Register of New York. The vessel will be classed in this register with half a hundred or more other big steel steamers built recently on the lakes.

In the large table of lake ship building returns elsewhere in this issue, the Craig Ship Building Co. of Toledo is credited with contracts for two wooden steamers. This is a mistake. The vessels are of the tow-barge kind, and are to be built for the Wisconsin & Michigan Railway Co. They are intended for the transfer of railway cars on Lake Michigan, and are to be similar to the barges built last winter by Capt. James Davidson of West Bay City, Mich.

Robert Curr, who was at one time employed by the Cleveland Ship Building Co., and who has of late been with the Bertram Engine Works of Toronto and the Union Dry Dock Co. of Buffalo, has just been appointed superintendent of the ship yard of the Globe Iron Works Co. Mr. Curr's early training was mainly with the Thomsons and Harland & Wolff, famous British ship buiiders. He has gained a thorough knowledge of lake practice through several years of experience here. We have known of his ability for a long time past and have every reason to anticipate a prosperous future for him in the trust that the Globe Iron Works Co. has placed in him. He is a young man who has devoted a great deal of study to advanced methods in ship building.

By the sale of the steamer Geo. W. Roby to Capt. W. S. Mack and others of Cleveland, F. W. Wheeler & Co. of West Bay City have realized a neat profit. When Wheeler & Co. contracted some time ago with Mr. Roby and others to build a steel steamer, it was agreed that the Geo. W. Roby should be taken in part payment for the new boat, at the close of the season just past, at $75,000. When this contract was made vessel property was not as valuable as at present. Now Wheeler & Co. sell the vessel, through Mitchell & Co. of Cleveland, to Capt. Mack for $90,000. The Roby is a very good wooden steamer. She was built by Wheeler & Co. in 1889. Capt. Mack and his associates now own three steamers and three schooners, all good wooden ships. They are the steamers V. H. Ketchum, Pascal P. Pratt and Geo. W. Roby and schooners W. D. Becker, Wadena and Anna M. Ash.

VESSELS LOST DURING 1895.

VALUED AT ABOUT A MILLION AND A QUARTER AND CAPABLE OF CARRYING NEARLY FIFTY THOUSAND TONS—SIXTY-THREE IN ALL.

In connection with the exhaustive information regarding new ships, printed elsewhere in this issue, it is interesting to note the capacity and value of vessels that actually passed out of existence during 1895. The list, which appears below, is quite a large one, and the item of capacity is probably more important than was expected. Only such vessels as are total losses in the real sense of the term are included. There are sixty-three of them, valued at $1,290,100. The freight vessels in the list were capable of carrying 48,975 net tons on 14 to 15 feet draft. As compared with previous years, the total losses during 1895 were as follows:

	1895.	1894.	1893.
Number of vessels	63	54	65
Capacity, net tons	48,975	31,415	41,625
Value	$1,290,100	$522,750	$1,172,200

VESSELS LOST ON THE LAKES DURING 1895.

NAME OF VESSEL.	DESCRIPTION.	CAPACITY, NET TONS.	VALUE.	CAUSE OF LOSS.
Everett, A	Steamer	1,200	$50,000	Sunk by ice.
Fairbank, N. K	Steamer	1,650	30,000	Fire.
Chicora	Steamer	800	115,000	Foundered.
Guide	Steamer		8,000	Fire.
Kimball, S. H	Schooner	650	5,000	Collision.
Cayuga	Steamer	2,700	225,000	Collision.
Kelley, Kate	Schooner	650	4,000	Foundered.
Norman	Steamer	2,700	160,000	Collision.
Evenson	Tug		2,000	Collision.
New Dominion	Steamer	550	7,000	Foundered.
Wells, C W	Tug		7,000	Fire.
Hartford	Schooner	700	6,000	Foundered.
Ferrett	Schooner	150	1,500	Collision.
Burlington	Steamer	300	12,000	Fire.
Magruder, J. H	Steamer	600	2,000	Ashore.
Arctic	Schooner	450	2,000	Collision.
Johnson, C. H	Schooner	650	4,000	Ashore.
Williams, E. R	Schooner	600	6,000	Foundered.
Comstock, A. W	Schooner	1,700	45,000	Foundered.
Queen City	Schooner	1,400	18,000	Ashore.
Baker, Gracie	Steamer	150	8,000	Fire
King, C. A	Schooner	550	4,000	Foundered.
Kershaw, C. J	Steamer	1,300	40,000	Ashore.
Moonlight	Schooner	1,400	23,000	Ashore.
Kent, H. A	Schooner	1,250	16,000	Ashore.
Carney, R. J	Schooner	650	4,000	Ashore.
Elma	Schooner	700	3,000	Ashore.
Lady Franklin	Schooner	650	4,000	Ashore.
Skylark	Schooner	650	4,000	Ashore.
Hunter, Elvina	Schooner	500	2,000	Ashore
Itasca	Schooner	700	5,000	Collision.
Reindeer	Schooner	450	2,000	Ashore.
Otter	Schooner	450	2,000	Ashore.
Duff, Nellie	Schooner	100	1,000	Foundered.
Commerce	Schooner	650	5,000	Ashore.
Red, White and Blue	Schooner	800	6,000	Ashore.
Otego	Steamer	350	8,000	Fire.
Mystic	Schooner	300	1,200	Ashore.
Ellsworth, Col	Schooner	650	3,000	Ashore.
Bruce, B. F	Schooner	1,200	18,000	Sunk.
Davis, G. W	Schooner	650	6,000	Ashore.
Richards, H. C	Schooner	800	12,000	Foundered.
Missoula	Steamer	2,400	90,000	Foundered.
St. Magnus	Steamer	1,200	35,000	Fire.
Africa	Steamer	750	12,000	Foundered.
Cibola	Steamer		127,000	Fire.
Campbell, Pearl B	Tug		4,000	Foundered.
Raber, John	Schooner	450	1,000	Ashore.
Mary	Schooner	500	5,000	Collision.
Severn	Schooner	700	5,000	Ashore.
Hanlan	Schooner	250	2,000	Fire.
Atwater, S. T	Schooner	650	3,500	Ashore.
Greenwood, W. T	Schooner	200	2,000	Ashore.
Worts, J. G	Schooner	650	6,500	Ashore.
Republic	Schooner	650	2,500	Foundered.
Johnson, C. N	Schooner	600	2,500	Sunk.
Groh, M	Steamer	800	6,000	Ashore.
Nicholson, E. A	Schooner	1,600	18,000	Ashore.
Almendinger, J. M	Steamer	225	8,000	Ashore.
Sheriffs, Jim	Steamer	1,100	30,000	Ashore.
Bell, M. C	Schooner	1,400	12,000	Ashore.
Adams, G. W	Schooner	2,100	30,000	Sunk by ice.
Willard, Julia	Schooner	400	1,400	Foundered.
Total		48,975	$1,290,100	

NOTE.—No account is taken of vessels of less than 50 tons register.

Employ Only Americans as Engineers.

The national organization of marine engineers has the sympathy of all Americans in the effort which is now being made in congress to pass a law which will permit of none but citizens of this country acting as engineers on American vessels. It is to be feared, however, that the engineers have attached some provisions to their bill that may delay or probably hinder altogether, the passage of the measure. The bill is now before both houses. It was introduced in the senate by Mr. Watson C. Squire of Washington and in the house by Representative Hopkins of Illinois. Mr. Squire's remarks in presenting the bill show that he will push the matter in a very determined manner and that he will direct special attention to the action of officials of the American line steamers Paris and New York, who retained English engineers aboard these vessels after they had been admitted to American registry under very favorable conditions. He said:

"When, a few years ago, a bill was passed granting, under certain conditions, a subsidy to American steamers for carrying the mails to foreign countries, there was a stipulation in that bill that these ships should be 'officered by American citizens.' When this bill was passed I am sure that it was the belief of every senator that this meant that, in all parts of the ship upon which her movements and her navigation depended, the responsible men in charge—call them what you will—should be American citizens. When the steamers of the American line were accorded the privilege of carrying the American flag, and thus taking advantage of the provisions of the postal subsidy act, the managers of this great line of steamers openly and successfully contended that the provisions regarding citizenship did not apply to the engineers, because, forsooth, in the eyes of the people who control this great line, an engineer was not an 'officer,' and so it goes to-day. The ships which we are annually paying a large subsidy for carrying the mails, under the supposition that they are officered by American citizens, actually have only a few real American citizens on board. The rest are foreigners upon whom we could not count in an emergency; men who have no interest in the ships save that which comes from their employment in time of peace. And thus is lost to us the very thing for which we are paying a subsidy—the building up of an American merchant marine and the officering and manning of these ships by truly American citizens, so that in the event of the services of these steamers being required by the government in case of war with a foreign government, they would be in a condition to at once be pressed into service. As it is now, the ships of the American line are officered in their engine rooms almost entirely by foreigners, and this fact was apparent a few days ago, when the papers gave an account of a sad catastrophe on board the American liner St. Paul, where most of the engineers are not citizens of this country. When this bill comes up for discussion I shall have something more to say on the subject, and shall endeavor to ascertain why it is that we are paying a subsidy to the steamers of this line for an ocean speed which I have heard stated they have never yet maintained in a voyage across the Atlantic—to a line which appears to be American only in name, and which for its own greed has seen fit to cry out to the civilized world that the engineers of their steamships are not officers and that therefore they need not be American citizens, a contention as humiliating as it is un-American. If the steamship companies which are getting subsidies from the government do not consider their engineers officers, I want congress to make them officers in the eyes of the law, so that in case of trouble with any country requiring the services of these steamers to supplement those of the navy, we shall have them already with their officers and crew as the act contemplated, and not as they now are, officered in their engine rooms by foreigners. Another thing which I want to see enacted into law is that these men shall be bona fide American citizens, and not merely men who have taken out their first papers and who may have no intention of going further in that direction. I believe that whenever and under whatever circumstances Americans have served, they have acquitted themselves most creditably, and I can not believe that the engine rooms of these big steamers are such mysterious places that the American marine engineer would be a stranger there. Our American engineers are serving creditably on vessels engaged in Oriental commerce and along the shores of Asia. I claim that they are equal to the Scotch or any other engineers. They get the best pay and perform as good service as any. Our country can depend upon them in its commerce in time of peace, and can depend upon them, if need be, in time of war."

Few people unacquainted with the details of ship construction have any thought of the vast amount of auxiliary machinery, such as electric light equipment, anchors, capstans windlasses, etc., that will be required aboard the sixty-five new ships reported elsewhere in this issue as now under contract on the lakes. In some lines where manufacturers of auxiliary machinery have devoted special attention to producing the best article on the market, whole establishments will be worked to their full capacity for months on orders resulting from this long line of contracts for new vessels. Take, for instance, the American Ship Windlass Co. of Providence, R. I. Probably 90 per cent. of the windlasses and capstans for these new vessels will be furnished by this concern. All of the steel schooners or tow barges in the list will be fitted with steam towing machines, and the Providence concern, which makes the only successful machines of this kind as yet brought out, will furnish all of these. Then, too, the enlargement of freight vessels has caused a demand for additional capstans. In addition to the usual windlass and capstan forward and capstan aft, the big steamers will have two more capstans. One of these will be placed aft of the forward house and the other just forward of the after house.

LAKE MICHIGAN ON ONE SHEET, THE FOURTH OF THE HYDROGRAPHIC OFFICE SERIES OF CHARTS, IS NOW IN PRINT AND MAY BE HAD FROM THE MARINE REVIEW, 516 PERRY-PAYNE BUILDING. PRICE 75 CENTS.

"ROPER'S LAND AND MARINE ENGINES," BOUND IN MOROCCO WITH FLAP AND POCKET, WILL BE MAILED TO ANY ADDRESS FOR $3.50 SENT TO THE MARINE REVIEW, CLEVELAND, O.

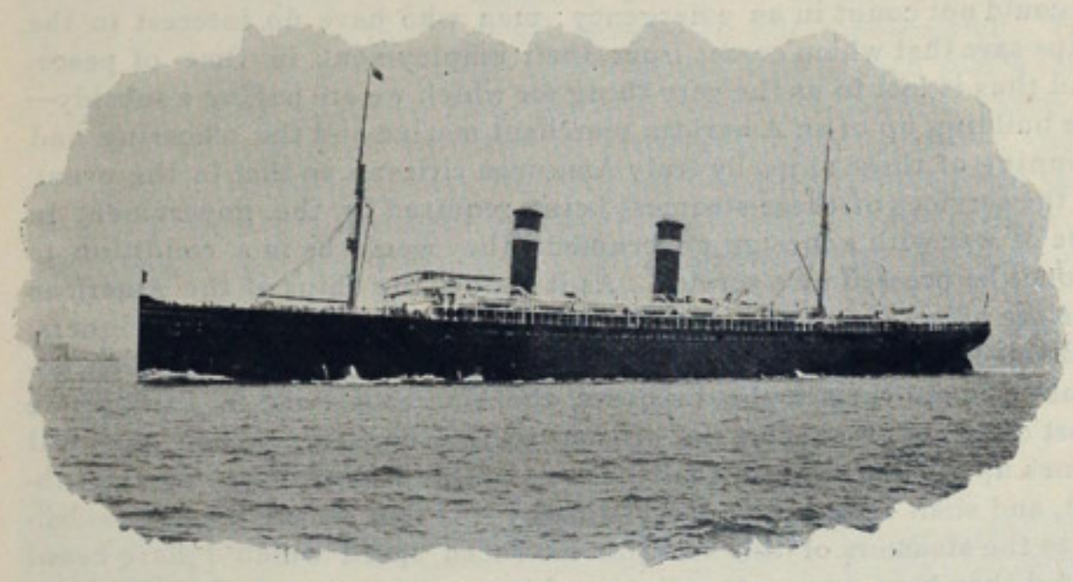
Around the Lakes.

Geo. Orr is the name selected for the package freight steamer building at South Chicago for C. W. Elphicke, Arthur Orr and others.

The schooner Penokee, which was owned iu Toledo for a great number of years, was sold in Detroit a few days ago by the United States marshal for $3,100.

Lieut. Charles S. Ripley, U S. N., is the officer selected to succeed Lieut. Blow in charge of the branch hydrographic office at Chicago. He comes from the coast survey schooner Eagre.

Eddy Bros., lumber dealers and vessel owners of Bay City, Mich., have just purchased about 360 acres of timber and iron lands in Minnesota from the Luther Mining Co. of Illinois for $100,000.



THE NEW AMERICAN LINER, ST. LOUIS.

Mr. W. A. Hawgood of Cleveland announces that the firm of Hawgood & Canfield was dissolved on Jan. 1, and that he will continue a brokerage business in the offices formerly occupied by Hawgood & Canfield, No. 608 Perry-Payne building.

Capt. Edward Maytham of Buffalo and Edward Baxter of Fort Erie, Ont., have purchased the old Detroit river ferry-steamer Hope for $5,000 cash. The vessel will be rebuilt, to run on the Canadian side of Niagara river between Buffalo, Black Rock and Victoria.

W. J. Conners, well-known boss stevedore of Buffalo, has purchased the Enquirer, one of the afternoon Buffalo papers. He has become very wealthy. In addition to his interest in the business of handling freight at Buffalo he is the principal owner in a large brewery and a director in two banks.

Little demand has as yet developed in Chicago for vessels to store grain. Corn is not in good condition for handling and there is no disposition to move wheat from the elevators to vessels. Vessel owners express a hope, however, that this delay may result in higher rates for storage room later on.

The two big passenger steamers and all of the freight steamers of the Northern line, except the Northern wave, which is undergoing extensive repairs at Detroit, are laid up at the head of Lake Superior. Buffalo certainly suffers quite a loss through the transfer of a large part of the Northern company's business to Duluth.

Harris T. Dunbar of Sault Ste. Marie, Mich., has purchased the interest of his father, C. F. Dunbar of Buffalo, N. Y., in the dredging plant and business of Dunbar & Sullivan, which includes the ship building yard and repair shops at Sault Ste. Marie. The members of the firm now are H. T. Dunbar, F. E. Dunbar and M. Sullivan.

It is announced definitely that Wm. Cumming of Cleveland who is the senior commander in the vessels controlled by M. A. Hanna & Co. of Cleveland, will be given the new steamer which the Globe company is building for the Mutual line. Capt. S. Stratton, who commanded the lost steamer Norman last season, will be given the place made vacant by the promotion of Capt. Cumming. No assignment of vessels will be made among the several masters until spring.

Grain cargoes at Buffalo have all been disposed of, excepting those which are to be held in vessels during a part or all of the winter. They are the wheat cargoes of the Neosho, J F. Eddy, Roumania and Adriatic, in all 259,000 bushels; the barley cargoes of the M. B. Grover, George Stone, and Iosco, 270,500 bushels; the oats cargoes of the John B. Lyon and Italia, 223,094 bushels, and the flaxseed cargoes of the Sitka and Topeka, 119,824 bushels—a grand total of 872,418 bushels.

The work of constructing new docks and improving terminals generally may be expected to increase in accordance with the heavier freight movement for which new ships are being built. Plans are now being made for more alterations and some enlargement of the docks of the Pennsylvonia Co., Cleveland. At Two Harbors the Duluth & Iron Range Railway Co. is to erect another ore shipping dock, the fifth, during the winter. Contracts have been let for this work. The dock will be 1,600 feet long, and about 6,000,000 feet of lumber will be used in its construction.

Etna Steamship Co. is the name of the corporation organized by Capt. John Mitchell of Cleveland to control one of the steel steamers that is being built by F. W. Wheeler & Co. of West Bay City, Mich. The vessel will be named Lagonda. The capital is $200,000. Incorporators are John F. Wedow, H. S. Hills, Philip Morris, Capt. S. Stratton, Capt. John Mitchell and Capt. Alfred Mitchell of Cleveland and Capt. J. J. H. Brown of Buffalo. The vessel is 386 feet over all, 45 feet beam and 28 feet deep, and will be fitted with triple expansion engines having cylinders of 23, 38 and 64 inches diameter and 48 inches stroke. Her three Scotch boilers will each be 12½ by 12 feet.

Stocks of Grain at Lake Ports.

The following table, prepared from reports of the Chicago board of trade, shows the stocks of wheat and corn in store at the principal points of accumulation on the lakes on Dec. 28, 1895:

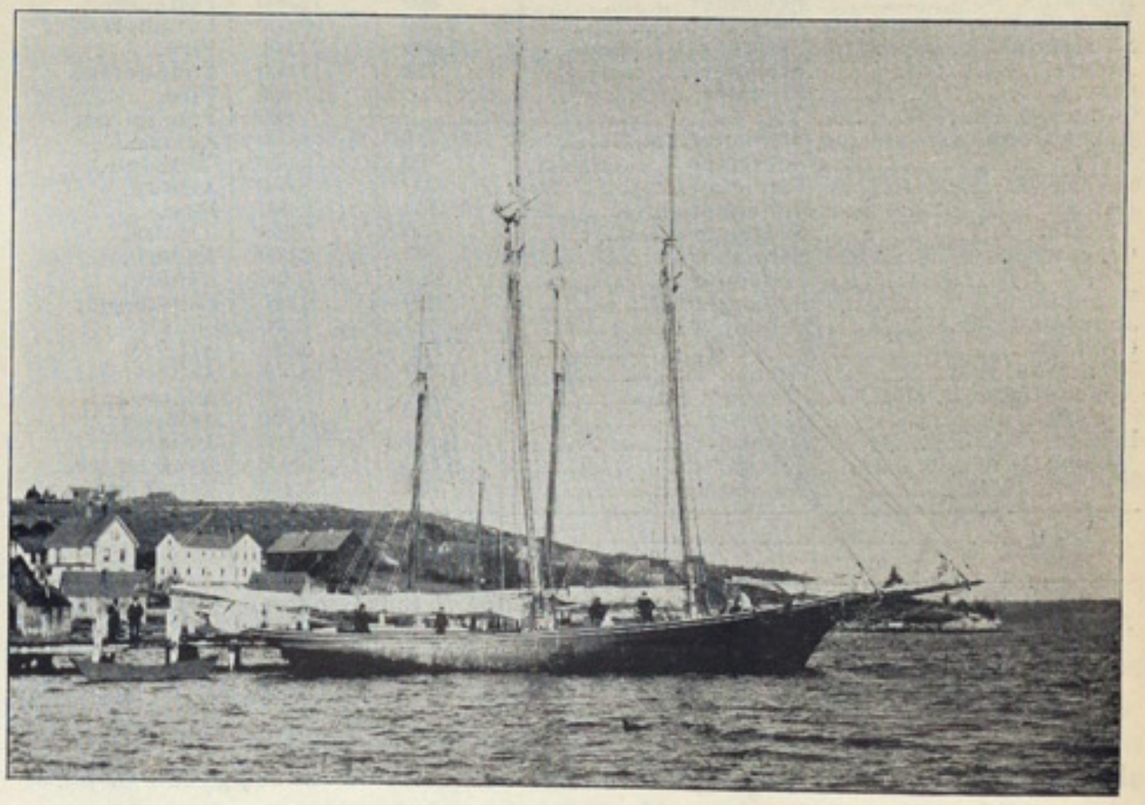
	Wheat, bushels.	Corn, bushels.
Chicago	21,203,000	911,000
Duluth	8,444,000	1,000
Milwaukee	935,000	.....
Detroit	367,000	29,000
Toledo	921,000	141,000
Buffalo	3,240,000	167,000
Total	35,110,000	1,249,000

As compared with a week ago, the above figures show at the several points named an increase of 557,000 bushels of wheat and 128,000 bushels of corn.

On Dec. 28 there was afloat at Chicago 205,000 bushels of corn and 61,000 bushels of oats; at Buffalo, 259,000 bushels of wheat, 223,000 bushels of oats, and 304,000 bushels of barley; at Duluth, 512,000 of wheat; and at Milwaukee 53,000 bushels of wheat.

Senate Committees.

Of the senate committees that will pass upon legislation pertaining to lake improvements the committee on appropriations and the commerce committee are most important. It is interesting therefore to note that Senator Allison of Illinois is chairman of the appropriations committee and that Mr. Brice, who has taken a special interest in lake commerce is a member of that committee. On the commerce committee the lakes will have the influence of Senator McMillan of Michigan, who is directly interested in vessels and in the Detroit Dry Dock Co., one of the largest of the ship building concerns. These two commlttees are made up as follows:

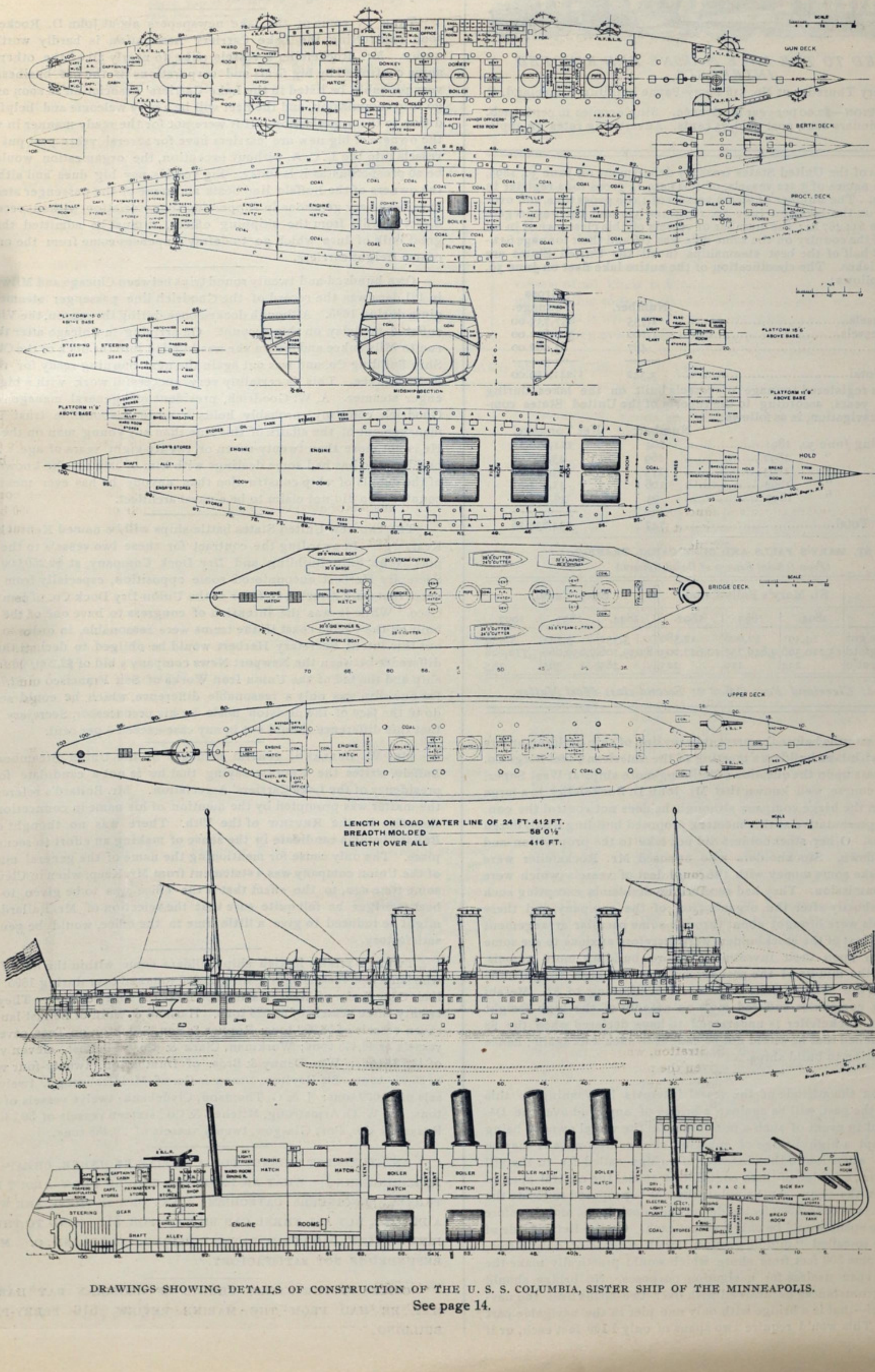


SCHOONER FOR FLORIDA PARTIES, BUILT BY W. I. ADAMS, E. BOOTHBAY, ME.

Appropriations—Allison (chairman), Hale, Cullom, Teller, Quay, Pettigrew, Perkins, republicans; Cockrell, Call, Gorman, Blackburn, Brice, Faulkner, democrats.

Commerce—Frye (chairman), Jones (Nev., Pop), Quay, McMillan, Squire, Elkins, Nelson, McBride, republicans; Vest, Gorman, White, Murphy, Berry, Pasco, Caffery, democrats.

☛SEND YOUR ORDER FOR "PATTERSON'S NAUTICAL DICTIONARY" ($5) TO THE "MARINE REVIEW" AT ONCE.



DRAWINGS SHOWING DETAILS OF CONSTRUCTION OF THE U. S. S. COLUMBIA, SISTER SHIP OF THE MINNEAPOLIS.

See page 14.

MARINE REVIEW

DEVOTED TO THE LAKE MARINE AND KINDRED INTERESTS.

Published every Thursday at No. 516 Perry-Payne building, Cleveland, O

SUBSCRIPTION—$2.00 per year in advance. Single copies 10 cents each. Convenient binders sent, post paid, 75 cents. Advertising rates on application.

The books of the United States treasury department on June 30, 1895, contained the names of 3,342 vessels, of 1,241,459.14 gross tons register in the lake trade. The number of steam vessels of 1,000 gross tons, and over that amount, on the lakes on June 30, 1894, was 359 and their aggregate gross tonnage 634,467.84; the number of vessels of this class owned in all other parts of the country on the same date was 316 and their tonnage 642,-642.50, so that half of the best steamships in all the United States are owned on the lakes. The classification of the entire lake fleet on June 30, 1895, was as follows:

Class.	Number.	Gross Tonnage.
Steam vessels	1,755	857,735.00
Sailing vessels	1,100	300,642.00
Unrigged	487	83,082.00
Total	3,342	1,241,459.00

The gross registered tonnage of vessels built on the lakes during the past five years, according to the reports of the United States commissioner of navigation, is as follows:

	Number.	Net Tonnage.
Year ending June 30, 1891	204	111,856.45
" " " 1892	169	45,168.98
" " " 1893	175	99,271.24
" " " 1894	106	41,984.61
" " " 1895	93	36,353.00
Total	747	334,634.28

ST. MARY'S FALLS AND SUEZ CANAL TRAFFIC.

(From Official Reports of Canal Officers.)

	St. Mary's Falls Canal.			Suez Canal.		
	1894.	1893.	1892.	1894.	1893.	1892.
No. vessel pass'ges	14,491	12,008	12,580	3,352	3,341	3,559
T'n'ge, net registd	13,110,366	9,849,754	10,647,203	8,039,106	7,659,068	7,712,028
Days of Navigat'n	234	219	223	365	365	365

Entered at Cleveland Post Office as Second-class Mail Matter.

SEVERAL months before the present heavy line of ship building orders were placed with lake builders a meeting of the American Steel Barge Co. was held to pass upon the question of building more ships at West Superior. It is, of course, well known that Mr. John D. Rockefeller is a large stockholder in the barge company although he does not control the concern. His representative at this meeting proposed building a half dozen or more ships. Other stockholders did not take to the proposition and it was voted down. Stockholders who opposed Mr. Rockefeller were anxious to make some money with the large fleet of vessels which were already in commission. They had received no dividends excepting such as were paid shortly after the organization of the company, and these early dividends were brought about through some peculiar arrangement of finances. Most of the stockholders were therefore anxious to see some further return upon their investment before building more vessels. Then toward the middle of the past season came on high freights, the ore rate from the head of Lake Superior soon climbing to $2. Mesabi range mining companies suffered most on account of the high freight rates, and Mr. Rockefeller is understood to have declared when the $2 figure was reached that he would not be caught in such a fix again; hence his determination to build ships.

OF COURSE the attitude of the vessel interests in Washington this winter, as in the past, will be against a bridge of any kind over the Detroit river, but in event of such a possibility as the vessel owners being forced to accept a high bridge of any kind as a compromise it may be well to direct attention to the character of bridge called for in the bill introduced, viz., a bridge of three continuous spans, the central span to be 1,100 feet in the clear. At the point where it is proposed to locate the bridge the river is only 2,300 feet wide between dock lines, and therefore the two shore spans would be only 600 feet each. On the Detroit side of the river the so-called "middle ground," with a depth of only 8 feet, extends out some 300 feet from shore, which would practically make the Detroit shore span useless for navigation purposes. No bridge should under any circumstances be allowed with over two spans over the navigable channel—that is a bridge with only one pier in the navigable part of the river. This would require two spans of only 1,100 feet each, or if the bridge be located near Twentieth street, two spans of 1,000 each will easily span the navigable channel.

TALK IN some of the lake newspapers about John D. Rockefeller soon controlling the Lake Carriers' Association is hardly worthy of notice. Mr. Rockefeller's vessels, alike to nearly all of the other steel ships controlled by big firms and corporations in the ore business, will very probably be listed in the Lake Carriers' Association as soon as they go into commission, and the fleet will be a very welcome and helpful addition to the organization. If it were not for the ready manner in which the owners of big new ore carriers have for several years past put their vessels into the L. C. A. without exception, the organization would not be so prosperous as it is today. Big vessels pay big dues and although the owners of the Buffalo line boats and some of the passenger steamers have been very generous in supporting the association, without receiving direct benefits from the shipping offices, it must be admitted that the great bulk of dues which go to defray expenses come from the ore and coarse freight carriers.

ONE hundred and twenty round trips between Chicago and Milwaukee in 121 days was the record of the Goodrich line passenger steamer Virginia during 1895. Although docked once during the season, the Virginia suffered no delay on this account. On arriving in Chicago after the day run to Milwaukee and return she was hurried into the dock of the Chicago Ship Building Co. and was out again the next morning ready for the run to Milwaukee. This is certainly very successful work with a big passenger steamer. A. W. Goodrich, president and general manager of the Goodrich company, probably holds a more responsible trust in the management of the affairs of this line than any young man on the lakes. He is not more than twenty-seven or twenty-eight years of age. A ship builder who has had some dealings with him of late says he knows more of the details of ship construction than anyone he has ever met in this country who did not claim to be a naval architect.

THE two new United States battle-ships will be named Kentucky and Kearsarge. In awarding the contract for these two vesse'ls to the Newport News Ship Building and Dry Dock Company, at $2,250,000 each, Secretary Herbert encountered some opposition, especially from influences that were directed in favor of the Union Dry Dock Co. of San Francisco. While it was the intention of congress to have one of the ships built on the Pacific coast if the terms were reasonable, in order to carry out this intent Secretary Herbert would be obliged to declare that the difference between the Newport News company's bid of $2,250,000 for one ship and the bid of the Union Iron Works of San Francisco of $2,740,000 for one ship was only a reasonable difference, which he could scarcely do in the face of the decision made by his predecessor, Secretary Tracy, that this difference should not in any case exceed 3 per cent.

MR. W. BULLARD, general manager of the Union Steamboat Co., Buffalo, writes the REVIEW saying that he is not a candidate for the presidency of the Lake Carriers' Association. Mr. Bullard's reference to the matter was prompted by the mention of his name in connection with the office in the REVIEW of the 19th. There was no thought of Mr. Bullard being a candidate in the sense of making an effort to secure the place. The only cause for mentioning the name of the general manager of the Union company was a statement from Mr. Keep, when in Cleveland some time ago, to the effect thst if the office was to be given to a line boat manager he felt quite sure that the selection of Mr. Bullard, who might be induced to give a little time to the office, would be generally satisfactory.

TWENTY-THREE British ship builders come within the list of those who launched vessels aggregating 20,000 tons and over during 1895. William Gray & Co. of West Hartlepool hold the first position. They built twenty-three vessels of 63,086 tons. Harland & Wolff of Belfast launched seven vessels of 58,093 tons; Ropner & Son, Stockton on Tees, seventeen vessels of 46,443 tons; Workman, Clark & Co. of Belfast, eleven vessels of 43,723 tons; Wm. Denny & Bros. of Dumbarton, twenty-four vessels of 35,028 tons; Sir Raylton, Dixon & Co. of Middlesbrough, twelve vessels of 33,030 tons; J. & G. Thomson, Clydebank, twelve vessels of 32,197 tons; Sir W. G. Armstrong, Mitchell & Co., sixteen vessels of 30,735 tons; Russell & Co., Port Glasgow, twenty vessels of 29,488 tons.

AN EXCELLENT LIBRARY FOR A MARINE ENGINEER, CHEAP—KEY TO ENGINEERING; WHAT AN ENGINEER SHOULD KNOW ABOUT ELECTRICITY; ENGINEERS' CATECHISM. ANY ONE OF THESE ARE WORTH A DOLLAR, BUT ALL THREE CAN BE HAD FOR $1. SEND TO THE MARINE REVIEW, 516 PERRY-PAYNE BUILDING, CLEVELAND, O. MONEY REFUNDED IF NOT SATISFACTORY.

COPIES OF THE LATEST CHARTS OF GEORGIAN BAY HARBORS MAY BE HAD FROM THE MARINE REVIEW, 516 PERRY-PAYNE BUILDING.

ANNUAL REPORT OF SHIP BUILDING.

$32,627,500 IS THE VALUE OF NEW SHIPS BUILDING IN THE UNITED STATES—GREATEST SHIPBUILDING YEAR IN THE HISTORY OF THE LAKES—$8,549,000 NEW TONNAGE IN LAKE YARDS—$6,040,000 IN COAST SHIP YARDS-$537,650 IN RIVER SHIP YARDS—$17,500,600 NAVAL WORK IN COAST YARDS.

The MARINE REVIEW'S annual report of shipbuilding for the United States shows more new work in lake ship yards than ever before, and while figures for a period of years showing new coast work at the close of the year are not in hand, it is believed that the report shows more merchant and naval work in coast yards than for any year during the past decade. The new work in lake ship yards is tabulated below and shows a total of sixty-five vessels of all kinds. Thirty of the sixty-five are steel freight vessels, twenty of them being steamers. These thirty vessels will average 400 feet in length and the cargo capacity will average nearly 4,000 tons on 14½ feet draft. In valuation these thirty steel steamers will average $200,000 each. It will thus be seen that there is no shipbuilding district in the world can show such a fleet of cargo vessels under construction at one time. The balance of the sixty-five craft under construction includes a $300,000 car ferry, a $375,000 passenger steamer, wooden freight steamers, barges, tugs and steam yachts. Two handsome specimens of the latter are under construction at Racine, Wis., and Buffalo, N. Y. The only year that compares with the total of this year is 1887, about the time when steel veasels began to be constructed in fleets on the lakes. The advent of John D. Rockefeller into the vessel business, and the relation the southern shore of Lake Erie and its accessibility from the mines of Lake Superior bears to the steel manufacture in the United States, will go far towards indicating that lake ship yards are entering another decade of prosperity. The opening year is certainly very satisfactory and promising.

The total cargo capacity of the forty-two freight carrying vessels, on 14½ feet draft, is 136,600 gross tons. Allowing the average number of trips during the coming season the new fleet next year will move about 2,458,000 tons of ore or coarse freight. The valuation of the entire fleet of sixty-five vessels of all kinds is $8,549,000. Contemplated contracts will probably increase this to $9,000,000 during the next three months. As a matter of curiosity it is noted that if these sixty-five vessels were put together end to end, they would make a line 3¼ miles long.

NEW SHIP BUILDING IN LAKE SHIP YARDS, JAN. 1, 1896.

BUILDERS.	CLASS.	DIMENSIONS.	Capacity of freight vessels, gr. tons, 14½ feet draft.	VALUE.	FOR WHOM BUILDING.
F. W. Wheeler & Co., W. Bay City, Mich.	Steel car ferry	350x56 x37	.....	$300,000	F. & P. M. R. R. Co., Saginaw, Mich.
" " " " " "	" freight steamer	400x48 x28	3,800	225,000	Roby & Waldo, Detroit, Mich.
" " " " " "	" " "	384x45 x26½	3,200	210,000	Eddy Bros., Bay City, Mich.
" " " " " "	" " "	384x45 x26½	3,200	210,000	D. Whitney, Jr., Detroit, Mich.
" " " " " "	" " "	384x45 x26½	3,200	210,000	John Mitchell, Cleveland, O.
" " " " " "	" " "	428x48½x28	4,000	250,000	Pickands,Mather & Co., Cleveland
" " " " " "	" " barge	360x44 x26	4,000	135,000	" " " "
" " " " " "	" " "	360x44 x26	4,000	135,000	" " " "
Chicago Ship Building Co., So. Chicago, Ill.	Steel freight barge	352x44 x26	4,000	140,000	Minnesota Steamship Co., Cleveland.
" " " " " "	" " "	342x44 x26	4,000	140,000	" " " "
" " " " " "	" " "	352x44 x26	4,000	140,000	Northwestern Trans. Co , Detroit.
" " " " " "	" " steamer	326x42 x26¼	3,000	200,000	C. W. Elphicke & Co., Chicago, Ill.
" " " " " "	" " "	400x48 x28	4,000	250,000	Minnesota Steamship Co., Cleveland.
" " " " " "	" " barge	352x44 x26	4,000	140,000	" " " "
" " " " " "	" " "	352x44 x26	4,000	140,000	Pickands, Mather & Co., Cleveland
" " " " " "	" " "	352x44 x26	4,000	140,000	" " " "
Detroit Dry Dock Co., Detroit, Mich.	Side wheel pass. stmr	.....	.....	375,000	Cleve. & Buffalo Trans. Co., Cleveland
" " " " " "	Steel lumber steamer	254x42 x14	2,000	135,000	Fisher, Wilson Co., Cleveland, O.
" " " " " "	" freight steamer	420x46 x28	4,000	265,000	Wolverine Steamship Co., Detroit
" " " " " "	" " "	438x45½x28	4,000	270,000	Pickands, Mather & Co., Cleveland.
" " " " " "	" " "	438x45½x28	4,000	270,000	" " " "
Globe Iron Works Co., Cleveland, O.	Steel freight steamer	432x48 x28	4,100	270,000	Mutual Trans. Co., Cleveland, O.
" " " " " "	Revenue cutter	205x32 x...	.....	150,000	U. S. Treasury Department.
" " " " " "	Steel freight steamer	432x48 x28	4,100	270,000	Pickands, Mather & Co., Cleveland
" " " " " "	" " "	432x48 x28	4,100	270,000	" " " "
Cleveland Ship Building Co., Cleveland, O.	Steel freight steamer	395x44 x28	3,800	*225,000	Wilson Transit Co., Cleveland, O.
" " " " " "	" " "	400x48 x28	4,000	*270,000	Zenith Transit Co., Duluth, Minn.
" " " " " "	" towing "	100x23 x12½	.....	*25,000	Duluth & Iron Range R. R , Duluth.
" " " " " "	" freight "	406x48 x28	4,200	*250,000	Pickands, Mather & Co., Cleveland.
American Steel Barge Co., W. Superior, Wis.	Steel freight steamer	380x45 x26	3,500	230,000	Amer. Steel Barge Co., W. Superior.
" " " " " "	" " barge	360x45 x26	3,700	145,000	" " " " " "
" " " " " "	" " steamer	404x48 x27	4,100	245,000	Pickands, Mather & Co., Cleveland
" " " " " "	" " barge	326x47 x26	4,000	145,000	" " " "
Union Dry Dock Co., Buffalo, N. Y.	Steel steam yacht	146x17½x10	.....	60,000	W. J. Conners, Buffalo, N. Y.
" " " " " "	" freight steamer	340x44 x28	3,000	225,000	Union Steamboat Co., Buffalo. N. Y.
" " " " " "	" pass. steamer	215x32 x 9½	.....	60,000	Chautauqua StmbtCo. Jamest'wn, N.Y
Craig Ship Building Co., Toledo, O.	Steel tug	145x30 x16¼	.....	55,000	Wisconsin & Mich. R. R. Co.
" " " " " "	Wooden steamer	.....	.....	.....	.....
" " " " " "	" "	.....	.....	.....	.....
James Davidson, W. Bay City, Mich.	Wooden steamer	373x43 x26	2,500	115,000	James Davidson, W. Bay City, Mich.
" " " " " "	" "	257x41 x24	2,000	90,000	" " " " "
" " " " " "	" barge	280x45 x20	2,000	80,000	" " " " "
" " " " " "	" "	280x45 x20	2,000	80,000	" " " " "
" " " " " "	" "	280x45 x20	2,000	80,000	" " " " "
Bertram Engine Works, Toronto, Ont.	Steel passenger stmr	254x... x...	.....	70,000	Niagara Navigation Co., Toronto, Ont
" " " " " "	" towing "	130x40 x...	.....	45,000	Upper Ottawa Improvement Co.
" " " " " "	" " "	141x44 x...	.....	50,000	" " " "
Jenks Ship Building Co., Port Huron, Mich.	Wooden freight stmr	254x... x...	1,800	80,000	Builders' account.
Abram Smith & Son, Algonac, Mich.	Wooden freight barge	210x37 x14	1,800	55,000	" "
Alex Anderson, Marine City, Mich.	Wooden freight barge	200x36 x13	1,200	50,000	Connelly Bros., Buffalo, N. Y.
Langell & Sons Co., St. Clair, Mich.	Wooden freight barge	270x40 x22	1,500	75,000	Langell & Sons Co., St. Clair, Mich.
The Calvin Co., Garden Island, Ont.	Paddle towing steamer	125x25 x 9	.....	15,000	For builders.
Montreal Transportation Co., Kingston, Ont.	Three-masted schooner	.....	1,800	55,000	For builders.
Marine Iron Works, Chicago, Ill.	Five small steam craft	.....	.....	14,000	For various parties.
Wyandotte Boat Co., Wyandotte, Mich.	Changing barge to stmr.	212x34 x...	.....	10,000	.....
Walter Crysler, Harbor Springs, Mich.	Steamer	93x18 x 7	.....	9,000	For builders.
R. C. Brittain, Saugatuck, Mich.	Steamer	75x15 x 6½	.....	5,000	For builders.
John Martel, Saugatuck, Mich.	Sail yacht	65x14 x 7	.....	5,000	J. Smithers, Douglas, Mich.
E. W. Heath, Benton Harbor, Mich.	Two tugs	85x20x74 x17	.....	30,000	Green Dredging Co., Chicago, Ill.
Hausler & Dunham, So Chicago, Ill.	Tug	95x20	.....	19,000	Dunham Towing Co., Chicago, Ill.
Racine Wis. Boat Mfg. Co., Racine, Wis.	Steam yacht	130x18	.....	75,000	F. N. Morgan, Chicago, Ill.
Burger & Burger, Manitowoc, Wis.	Rebuilding Menominee.	213x35 x11½	.....	50,000	Goodrich Trans. Co., Chicago, Ill.
Shipowners' Dry Dock Co., Cleveland, O.	Tug	80x19 x10	.....	12,000	Jos. Duherst, Huron, O.
Daniel Runnels, Port Huron, Mich.	Tug	.....x .. x...	.....	7,000	For builders.

*Estimated

VESSELS UNDER CONTRACT IN LAKE SHIP YARDS EACH YEAR FOR TEN YEARS PAST.

December 31.	Number of boats.	Capacity, gross tons.	Valuation.
1886	31	65,750	$4,074,000
1887	60	108,525	8,325,000
1888	59	100,950	7,124,000
1889	56	124,750	7,866,000
1890	38	77,950	5,337,000
1891	45	76,000	4,896,000
1892	49	68,470	6,909,500
1893	28	26,400	2,538,500
1894	29	33,150	2,932,500
1895	65	136,600	8.549,000

Following lake ship yards report nothing building: John E. Monk, Sandusky, O.; R. W. Linn, Gibralter, Mich.; Milwaukee Dry Dock Co., Milwaukee, Wis.; Hamilton Bridge Works. Hamilton, Ont.; Bell's Steam Engine Works, Buffalo, N. Y.; Curtis & Brainard, Toledo, O. and Marine City, Mich.; Rieboldt, Wolter & Co., Sheboygan, Wis.; Wm. Dulac, Mt. Clemens, Mich.; Morley & Co , Marine City, Mich.

COAST SHIP BUILDING,

As usual the naval work predominates in coast ship building, and some twenty-one naval vessels, with a valuation of $17,500,600 in course of construction or completion or, as in the case of the Newport News company, just contracted for, shows a good condition of affairs in coast yards, and as compared with last year nearly three times as great, excluding the valuation of the two American liners St. Louis and St. Paul. There arc in coast yards 105 merchant vessels and pleasure craft, with a valuation of $6,040,400. Over one-half of the valuation is made up of passenger vessels for coast service, but there are no large general cargo carrying vessels under construction, which is a sad comment on the United States coastwise carrying trade. The most interesting work in coast yards is the $800,000 paddle-wheel steamer for Hudson River service and the $625,000 passenger steamer for the Plant line. In the river yards there are building twenty-four vessels of all kinds with a total valuation of $537,650. This is more than double the valuation of new work last year. Summing up the conditions in all parts of the United States, the new work in lake and coast yards shows an increase of nearly two-thirds and river yard work one-half.

We are indebted for the information to coast ship builders who have come to recognize the REVIEW'S annual report as being valuable and interesting and the response to our inquiries was so general that no apology concerning its fullness and reliability is necessary. In this connection we we congratulaee our advertisers on the prospects of a very profitable year,

THE WM. CRAMP & SONS SHIP AND ENGINE BUILDING CO,, PHILADELPHIA.

Cruiser Brooklyn	400x64x24	$2,986,000	U. S. Navy.
Battle ship Iowa	360x72x24	3,010,000	U. S. Navy.
Towboat Tamaqua	170x29x18	100,000	Philadelphia & Reading Railroad Co.
Freight steamer No. 287	240x42x14½	250,000	Southern Railway Co.

HARLAN & HOLLINGSWORTH CO., WILMINGTON, DEL.

Light draft screw stmer	150x25x12	175,000 estimated,	Old Dominion S.S.Co., N. Y.
Stl side-wheel pass. str..	238x62x35	225,000 estimated,	Montauk Stmbt Co., Lim., N.Y.

NEWPORT NEWS SHIP BUILDING AND DRY DOCK CO., NEWPORT NEWS, VA. AND 1 BROADWAY, NEW YORK.

Two Gunboats	251½x40x25	$1,000,000	U. S. Navy.
One Gunboat	233½x38x25		
Steel Pass. Str.	405x47⅔x37⅓	625,000	Plant Investment Co., New York.
Steel Pass. Str.	376x44x32½	500,000	Cromwell Steamship Co., New York.
Steel Pilot Boat	115x21x15	50,000	Pensacola Pilot's Association.
Two Battle Ships	368x72x23½	5,000,000	U. S. Navy.

COLUMBIAN IRON WORKS & DRY DOCK CO., BALTIMORE, MD.

Torpedo B'ts, Nos. 3, 4, 5	160x16	$ 392,500	U. S. Navy.
Submarine Torbedo B't	34x12	150,000	U. S. Navy.

THE CHAS, HILLMAN SHIP AND ENGINE BUILDING CO., PHILADELPHIA, PA.

Twin-screw Str.	140x24x9½	$ 80,000	J. A. Denny & Bro., Penn' Grove, Pa.

UNION IRON WORKS, SAN FRANCISCO, CAL.

Battle Ship Oregon	348x69x35	$3,250,000	U. S, Navy.
Gunboats Nos. 14 and 15	174x34	448,000	U. S. Navy.
Four Barges	80x20x10	44,000	Pacific Mail Co.
Tank steamer	178x29x17	110,000	Pacific Coast Oil Co.
Twin screw pass. st'mer..	150x17x 9	60,000	L. D. Bliss & Co.
Eleven barges	180x35x 7	121,000	Amour River Co., Russia.

T. S. MARVEL & CO., NEWBURGH, N. Y.

Two caissons		$ 72,000	New York Navy Yard dry docks.
Two tugs	50x14x 6	13,000	One for San Domingo, one for stock.
Steam yacht	65x17x 5	9,000	Rondout parties.
Sail yacht	65x15x13	25,000	

WM. E. WOODALL & CO., BALTIMORE, MD.

Four barges	100x26x 8	$ 20,000	Baltimore parties.

JACKSON & SHARP CO., WILMINGTON, DEL.

Freight barge	100x23x 7	$ 20,000	Charles Warner Co.
Passenger propeller	85x20x 6	35,000	Capt. H. Brower,

Machinery by Neafie & Levy, Philadelphia.

IOWA IRON WORKS, DUBUQUE, IA.

New hull for snag boat and torpedo boat Ericcson and revenue cutter Wm, Windom.

GAS ENGINE & POWER CO., MORRIS HEIGHTS, NEW YORK, N. Y.

Twin screw naphtha yct	78x12½	$ 12,000	A. Van Sant Voord, New York City.
Twin screw naphtha yct	78x11	11,500	J. A. Mollenhauer, Brooklyn, N. Y.

BATH IRON WORKS, BATH, ME.

Stl stm ycht Peregrine..	159x23x10	$ 100,000	Ralph H. White, Boston, Mass.
Steel steam yacht..	130x18½x7½	70,000	Eugene Tompkins, Boston, Mass.
Composite Light-ship....	123x29	80 000	U. S. Light-house Service.
Gunboats Nos. 11 and 12	206x36x12	480,000	U. S. Navy.

DELAWARE RIVER IRON SHIP BUILDING AND ENGINE WORKS, CHESTER, PA.

Two freight steamers	280x43x19	$ 400,000	Vermont Central Railroad Co.
Freight steamer	150x27x 9	40,000	Chester Freight Line.
Steam yacht	130x20x11	40,000	Richard Storms, Hoboken, N. J.
Steam yacht	143x18x10	30,009	Builders' account.

CRESCENT SHIP YARD, LEWIS NIXON GENL. MGR., ELIZABETH, N. J.

Steam Yacht	225 feet	$ 165,000	for P. A. B. Widener, Philadelphia.
Ferry Boat	168 feet	105,000	for Penn. R. R. Co.
Gun Boat, No. 10	203 feet	230,000	for U. S. Navy.
Three steamers and ten barges		125,000	Clev'l'd Steel Canal Boat Co., Clev'l'd

NEAFIE & LEVY SHIP & ENGINE BLDG. CO., PHILADELPHIA, PA.

Freight and Pass. Str.	252x45x13½	$ 200,000	for N. Y. & H. Trans. Co.
Freight and Pass. Str.	252x35x20½	200,000	for Menendez & Co., Havana, Cuba.
Tug, No. 881	75x17½x8½	15,000	for W. & L. Co.
Tug, No. 885	92x19x10	20,000	for W. & L. Co.
Tug, No. 889	80x18x9	17,500	for F. W. Munn, Philadelphia, Pa.

Values estimated.

CHAS. L. SEABURY & CO., NYACK, N. Y.

Composite Yacht 135x16, one composite yacht 140x17, wooden yacht 85x12, and one launch 30x7½, estimated total valuation $95,000.

A. AXTON & SON, W. BROWNSVILLE, PA.

Tow Boat	195x34x5½	$ 50,000	W. H. Brown's Sons, Pittsburgh, Pa.

JOHN DIALOGUE & SON, CAMDEN, N. J.

Two Tugs	105 and 100x21	$ 66,000	one for New York harbor supervisor.
Gun Boat, No. 13	206x36x12	240,000	U. S. Navy.

H. M. BEAN, CAMDEN, ME.

Four Masted Schooner...	215x44x21	$ 65,000	Capt. J. G. Crowley, Taunton, Mass.

Four-masted schooner, 190x42x18, 1,300 tons, value $50,000; for Capt. J. Holmes.

NATHANIEL T. PALMER, HOUGHTON YARD, BATH, ME.

Four Masted Schooner...	244x42x20	$ 70.000	for Builders.

KELLY & SPEAR CO., BATH, ME.

Three Masted Schooner	138x36x10	$ 23,000	E. C. Smith & Co., Brooklyn, N. Y.
Two Coal Barges	190x35x16 155x34x11	41,500	Del. & Hudson Canal Co., New York.
Two Coal Barges	155x31x8	22,000	Staples Coal Co., Taunton, Mass.

INTERNATIONAL STEAMSHIP CO., PORTLAND, ME.

Screw Str. St. Croix..	265x40	$ 200,000	Hull built at Bath, Me., Engines by Portland Company.

FORE RIVER ENGINE CO., WEYMOUTH, MASS.

Steam yacht	115x16	$ 35,000	J. C. Rhodes, New Bedford, Mass.
Steam yacht	118x13	32,000	
Sail yacht	35x12	1,500	E. A, Cook, Boston, Mass.
Sail yacht	38x8½	2,200	
Several yachts		25,000	Contracted for 1896.

S. GILDERSLEEVE & SONS, GILDERSLEEVE, CT.

Coal barge	165x33x12	$ 14,000	For builders.

ARTHUR D. STORY, ESSEX, MASS.

Schooner	105x24⅔x10	$ 10,000	H. E. Heckman.
Schooner	90x22½x 9	7,500	For builders.

WM. McKIE, 100 BORDER ST., E. BOSTON, MASS.

Dredge	100x36x10	$ 25,000	Bay State Dredging Co.

Engines by Osgood Dredge Co., Albany, N. Y.

W. IRVING ADAMS, E. BOOTHBAY, ME.

Schooner	67x19⅔x 9	$ 5,500	E. E. Saunders & Co., Pensacola, Fla.

INTER-STATE LUMBER CO., CHATTANOOGA, TENN.

Transfer barge	225x34x 5½	$ 7,500	Linehan Ry. Tr'sfer Co., Dubuque, Ia.
Five barges	120x26x 6	60,000	Sparks, Roberts & Co., Kingston, Tenn.

L. D. SHAFNER, CLEMENTSPORT, N. S.

Schooner	81x26x 9	$ 8,000	For builder.

HALL BROS., PORT BLAKELEY, WASH.

Steamer No. 82, 192 feet over all, 34 feet beam, 16½ feet deep, value $112,000; for Inter-Island Steam Navigation Co., Honolulu, H. I. Engines are 15, 22 and 43 by 36 inches by Fulton Engineering and Shipbuilding Works, San Francisco, Cal.

C. V. MINOTT, PHIPPSBURG. ME.

Four-masted schooner Frances M., capacity 1,850 gross tons, value $55,000; for builder.

CHAS. HARRINGTON, BATH, ME.

Passenger steamer, propeller, 111 feet long, 22 feet beam, 28 feet over guards, 8 feet hold, hull value $8,000; machinery by the Portland Co.. Portland, Me; for Coburn Steamboat Co., Greenville, Me.

REES & SONS CO., PITTSBURGH, PA.

Freight and pass. stm'r..	145x28x 5	$ 40,000	For Miller & Rodreguis, Colombia, S.A.
Tow boat Jas. Moran	185x36x 6	65,000	For Posey & Selbold, Pittsburgh.
Tow boat Tornado	140x28x13	24,000	For Advance Coal Co., Pitisburgh,

McDONALD & BROWN, BELFAST, ME.

Schooner Josephine	181x36½x16½	$ 44,000	For C. M. Stewart & Co., Baltimore.

Ship Yard Notes.

Montague Iron Works Co., Montague, Mich., are building one fore and aft compound engine 18 and 36 by 30 inches for Hausler & Dunham's new tug, and one 20 and 40 by 30 inches for the Graham & Morton steamer City of Louisville.

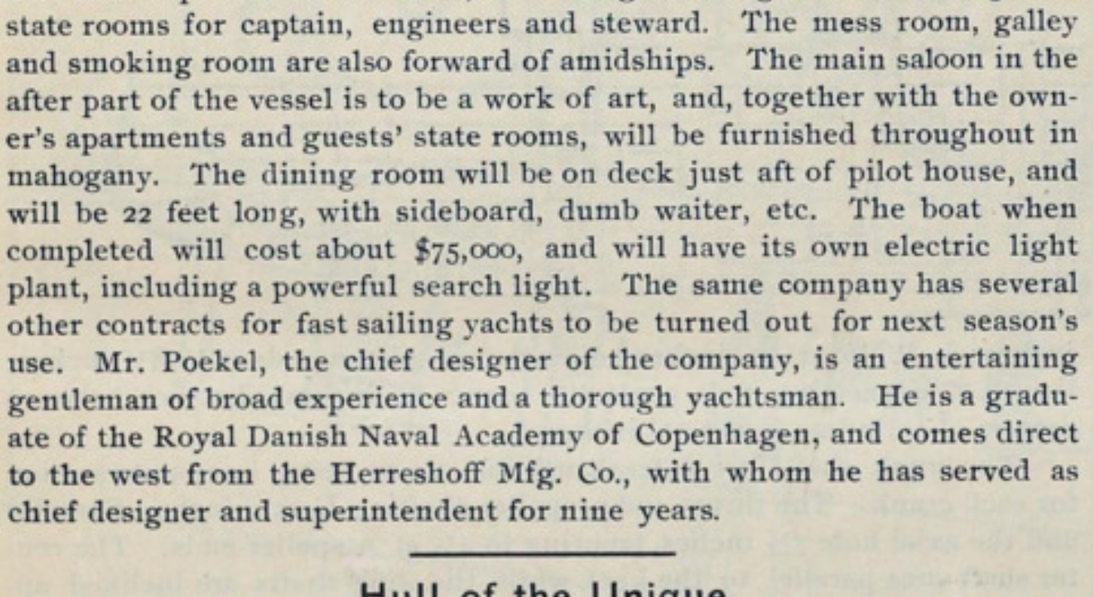
Nau Bros., Green Bay, Wis., will build a tug to take the place of the Charnley at Anderson's yard. She will w th one exception be the most powerful tug on Green Bay and will be equipped with a wrecking outfit and heavy machinery for pulling on stranded vessels.

The Bath Iron Works are now building two steel and three composite vessels. The most interesting of these vessels are the two steam yachts building for Messrs. R. H. White and Eugene Tompkins of Boston. These vessels are designed by the superintendent of the Bath Iron Works, Mr. Chas. Ridgely Hanscom, who is also the designer of the magnificent steam yacht Eleanor, and for beauty, accommodation, elegance and sea-worthiness these yachts will have no superior. Although very different from the Eleanor in model and arrangement, they have the same neat sheer with a graceful bow and stern, and the smart, rakish appearance that so characterizes their predecessor. Both yachts are to be fitted with triple expansion engines and Almy water tube boilers, and will be completed about next May.

The steel pleasure yacht designed for Mr. Fred W. Morgan of Chicago by the Racine Boat Mfg. Co. of Racine, Wis., is the first craft of the description to be built in the west, and too much credit cannot be given the owner or the designers for the originality displayed in this design. Mr. Morgan will certainly have one of the finest yachts afloat to-day, and it will be quite an acquisition to the Chicago fleet. The yacht is to be constructed entirely of steel, every plate being subjected to a severe test before entering into the construction. The dimensions given by the builders are, length over all 140 feet, beam 18 feet, draft 7 feet 6 inches, displacement 140 tons. There will be five bulkheads running athwartship, dividing the boat into six water-tight compartments. The main engine is a four-cylinder triple expansion engine of the piston valve type developing 850 H. P., and the steam will be supplied from a special tubular boiler designed for high duty, which will give the boat a speed of twenty miles per hour. There will be four other engines for operating pumps, blowers, dynamo and windlass. The yacht will be equipped for salt water use, and will have sufficient coal carrying capacity to safely cross the Atlantic. The crew's quarters are forward, and arranged for eight men, with separate state rooms for captain, engineers and steward. The mess room, galley and smoking room are also forward of amidships. The main saloon in the after part of the vessel is to be a work of art, and, together with the owner's apartments and guests' state rooms, will be furnished throughout in mahogany. The dining room will be on deck just aft of pilot house, and will be 22 feet long, with sideboard, dumb waiter, etc. The boat when completed will cost about $75,000, and will have its own electric light plant, including a powerful search light. The same company has several other contracts for fast sailing yachts to be turned out for next season's use. Mr. Poekel, the chief designer of the company, is an entertaining gentleman of broad experience and a thorough yachtsman. He is a graduate of the Royal Danish Naval Academy of Copenhagen, and comes direct to the west from the Herreshoff Mfg. Co., with whom he has served as chief designer and superintendent for nine years.

Hull of the Unique.

The most interesting craft on Detroit river this fall was the fast passenger steamer Unique. The accompanying view of her as she was on the



HULL OF STEAMER UNIQUE, AT ANDERSON'S MARINE CITY, MICH., YARD.

stocks at the yard of Alex Anderson, Marine City, Mich., will attract attention. She is probably the finest modelled hull on the lakes, with the possible exception of the steam yacht Say When, and the work on her reflects considerable credit on her builder.

I. L. SNOW & CO. ROCKLAND, ME.

Schooner.....	360 tons	$ 20,000	For builders.

ELMER A. ELY, MIDDLETOWN, CONN.

Steam yacht.....	75x14	$ 4,000	For Henry Bullard, Middletown, Conn.
Steam yacht.....	30x 7	1,000	For J. T. Case, Bristol, Conn.

Both engines by G. E. Whitney, Boston, Mass.

ATLANTIC WORKS, E. BOSTON' MASS.

Composite steamer.....	205x32x17	$ 160,000	For U. S. Revenue Service.

JAMES M. BAYLES & SON, PORT JEFFERSON, L. I., N, Y.

Steam yacht.....	130x20x11	$ 45,000	E. S. Renwick.

MADISON MARINE RY. AND SHIP YARD, DAVID BARMORE, MADISON, IND.

Ferry boat.....	110x30x 4	$ 10,000	Taylor & Co., Madison, Ind.
Seven barges.....	135x28x 5	24,500	Maj. Allen, St. Louis, Mo.
Steamer Harvester.....	200x35x 6	55,000	St. Louis & M.V. Trans. Co., St. Louis.
Survey steamer.....	113x18x 4	2,100	U. S. Government Engineer.

In addition to new work at this yard, $141,600 worth of repairs will be made on a fleet of seventeen river craft of all kinds.

McENTEE & DILLON, RONDOUT, N. Y.

Twin screw tug.....	65x19x 7	$ 12,000	Andreas & Co., New York. N. Y.
Two lighters.....	40x15x 5½	9,000	Andreas & Co., New York, N. Y.

FILLMORE A. BAKER, PATCHOGUE, L. I.

One 38 and one 33 foot sloop,.....		$ 2,200	Jamaica and Patchogue parties.

JOHN ENGLIS & SON, GREENPOINT, BROOKLYN, N. Y.

Side-wheel steamer.....	404 ft. long	$ 800,000	People's Hudson River Line.

GODFREY MARINE WAYS CO., LYONS, IA.

Tug	70x14x 8	$ 8,200	Linehan R.R. Trans. Co., Dubuque, Ia.
Dredge	80x30x 8	16,000	U. S. Government.
Steamer Vivian.....	90x21x 3½	7,850	Capt. Duley, Clinton, Ia.
Steamer Jo. Long.....	125x23x 3½	13,000	Jo. Long Towing Co., Davenport, Ia.

Machinery for dredge by Osgood Dredge Co., Albany, N. Y.
Machinery for steamer Vivian by Taylor Bros., Clinton, Ia.

COAST AND RIVER SHIP BUILDING NOTES.

Diamond Jo. Line, Dubuque, Ia., is building a new hull, 265x42x6 feet, for steamer Gem City, amounting to about $15,000.
Brusstar Ship Building Co., Baltimore, Md., are rebuilding extensively the revenue bark Chase, lengthening her 32 feet, $14,000.
Rice Bros , E. Boothbay, Me., are building several yachts.
James & Tarr, Essex, Mass., have just completed a lighter.
Washburn Bros., Thomaston, Me., are building a large schooner.
A. & M. Gammage & Co., So. Bristol, Me., are building a 60-foot steamer, value $3,000, for Rolbrash & Trefethen, Portland, Me.
McDonald & Brown, Belfast, Me., are building a large schooner.

Following coast and river yards report nothing building:
Northrop & Vanderwecker, Fort Edward, N. Y.
Oregon Railway & Nav. Co., Portland, Ore.
Chas. J. Rossiter & Co., Baltimore, Md.
Henry Sutton, New Haven, Conn.
St. Louis & New Orleans Anchor Line, St. Louis, Mo.
M. G. Knox & Son, Marietta, Ohio.
John H. Crandon, Columbia Falls, Me.
S. H. Barbour, Brewer, Me.
Eastern Steamboat Co., Bath, Me.
Morse & Co., Bath, Me., and 18 Broadway, New York.
E. S. Crosby, Bath, Me.
Pusey & Jones Co., Wilmington, Del.
Peoples Marine Railway, Baltimore, Md.
John P. Smith, Nyack, N. Y.
Willard A. Burnham, So. Essex, Mass.
N. H. Timbs, Fairport, Va.
Clay & Johnson, Kissimee, Fla.
Lutcher & Moore Lumber Co., Orange, Tex.
Maryland Steel Co., Sparrows Point, Md.

REPORTS FROM VARIOUS SOURCES.

Capt. Isherwood is building a barge for the Phœnixville Bridge Co., Davenport, Ia.

Portland Steamship Co., Portland, Me., are considering the building of a 300-foot steamer.

Lawrence Newhall & Co., Waterville, Me., are building a steamer 52 feet long.

Naval Architect Binney, Boston, Mass., is designing a 112-foot steamer for the police department.

J. M. Robbins, Erie Basin, New York, will build a 250-foot steam yacht for A. L. Barber.

Gilbert N. Smith, Patchogue, N. Y., is building five small sailing craft.

Matcher & Ward, Port Jefferson, L. I., will build three schooners.

Robt. Palmer & Son, Noank, Conn., will build a 60-foot yacht and six barges.

Chas. Reeder & Sons, Baltimore, Md., are building a screw steamer for the Wheeler Transportation Co.

AN EXCELLENT LIBRARY FOR A MARINE ENGINEER, CHEAP—KEY TO ENGINEERING; WHAT AN ENGINEER SHOULD KNOW ABOUT ELECTRICITY; ENGINEERS' CATECHISM. ANY ONE OF THESE ARE WORTH A DOLLAR, BUT ALL THREE CAN BE HAD FOR $1. SEND TO THE MARINE REVIEW, 516 PERRY-PAYNE BUILDING, CLEVELAND, O. MONEY REFUNDED IF NOT SATISFACTORY.

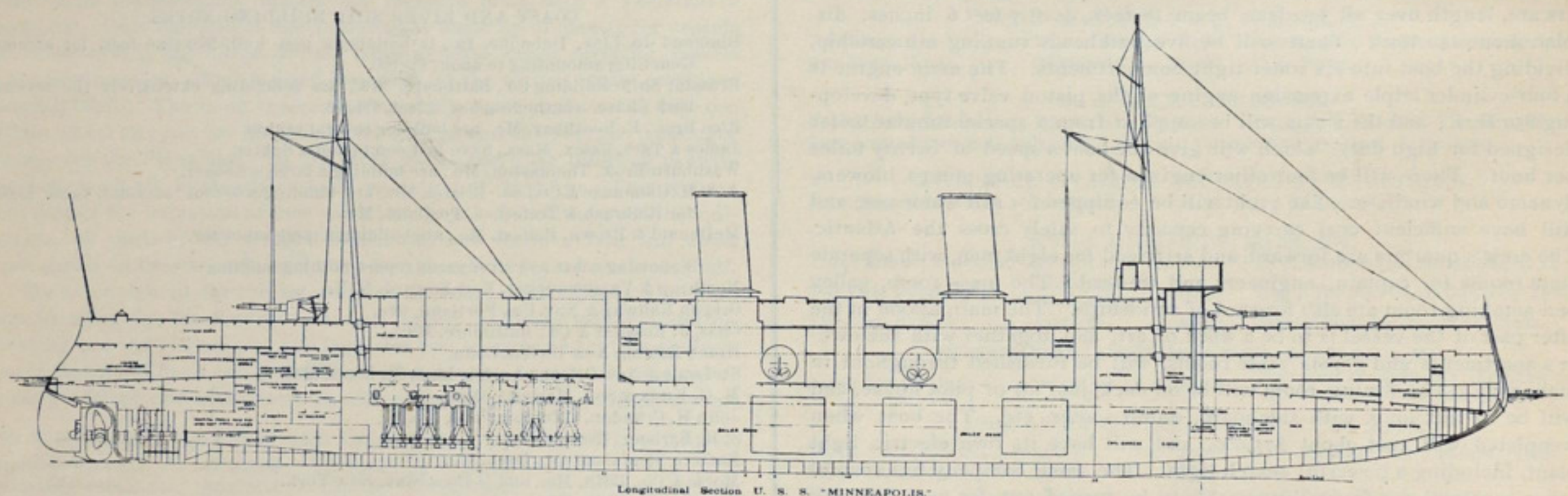
U. S. CRUISER MINNEAPOLIS.

THE FASTEST WAR SHIP IN THE WORLD—A FULL DESCRIPTION OF A SHIP FROM WHICH A GREAT DEAL WOULD BE EXPECTED IN A NAVAL ENCOUNTER WITH ENGLAND.

Accompanying this issue will be found a photo-chromotype illustration of the U. S. cruiser Minneapolis, reproduced from an oil painting made for the REVIEW by an artist who was sent to Philadelphia for this purpose. It has attracted probably as much attention as any marine scene published recently and the readers of the REVIEW will be pleased at having a copy of it. In view of the fact that our war ships have become very interesting subjects during the past month a full description and illustration of one of the most formidable is given below.

The Minneapolis was designed by the Navy Department, and built by the Wm, Cramp and Sons Ship and Engine Building Company, of Philadelphia, Pa. The expansion of general designs into exact details, together with the piping systems and location of the auxiliary machinery, being done by the contractors. In the case of the machinery alone, this necessitated the making of some 300 separate drawings, a fact which indicates in a way the magnitude of the task. The price for the ship complete was $2,690,000, and through a clause providing a bonus for excess of contract speed the builders were paid $414,600 more.

The weight of the machinery was limited to 2,000 tons (about one-tenth of a ton per designed horse power), which weight included water in the boilers, and in condensers, pumps, pipes and stern tubes, but did not include weight of stores, heating apparatus, spare parts, tools in workshop, capstan, windlass, steering gear or winches. At the time of the trial this "included" weight amounted to 1961.8 tons, leaving ample margin for escaping another penalty which the contract imposed on overweight, and



Longitudinal Section U. S. S. "MINNEAPOLIS."

which was $500 per ton up to 5 per cent., beyond which an additional $10,000 was to be attached.

The type of the ship is a protected cruiser, or commerce destroyer, 412 feet long and 58 feet beam, with a normal draught of 24 feet. The hull is of mild steel, the skin being of but a single course, of 22½-pound plating, (about ⅞-inch thick). There is a double bottom divided by water tight floors into 17 compartments, which extend across the ship through lightening holes in the keel. Besides these, there are 198 other water tight compartments below the gun deck. A protective deck covers the hull proper from stem to stern. This is made of two courses of 1¼-inch nickel steel, to which, on the slopes over the machinery spaces, another course 1½ inches thick is added, making 4 inches of steel where most needed. This protective deck joins the vessel's sides at 4 feet 6 inches below the normal water line, and "crowns" one foot above that water line. The main boiler compartments are not divided longitudinally, and are the largest compartments below the protective deck, the forward one being 67 feet long and the after one 69 feet. The engine compartments occupy a total length of 76 feet, excluding shaft alleys, making 212 feet in length of the hull for the machinery proper, or about half the entire length of the ship. Beside the commanding officer's quarters, there are rooms fitted up for the accommodation of eighteen ward-room officers, eight junior officers, and three warrant officers, and there is berthing space for 417 petty officers, crew and marines.

The armament consists of one 8-inch 40 caliber rifle, two 6-inch 40 calibre rifles, eight 4-inch rapid fire guns, in 4-inch sponsons, eight 6-pounder rapid fire guns, in 2-inch sponsons, four 6-pounder rapid fire guns, on upper deck, four gatling guns, four 1-pounder rapid fire guns, two torpedo tubes on bows, and two torpedo tubes on quarters.

The dimensions of the hull are: Length between perpendiculars, 411 feet 7 inches; length on l. w. l., 411 feet 7 inches; length over all, 414 feet 10 inches; beam, 58 feet 2 inches; ratio of length to beam, 7.08; depth of hold, top of floors to top of main deck beams, 37 feet 3 inches; draught, mean, sea going trim normal, 24 feet; displacement normal, 8,005; tons per inch, l. w. l., 37.2; area of immersed midship section, l. w. l., 1,212 square feet; area of l. w. l. plane, 15,600 square feet.

There are three similar sets of main engines, each set in a separate water-tight compartment, the center engine room being abaft the starboard and port engine rooms, which are abreast of each other, as shown in the illustration. The type of engine is the inverted, direct acting three-cylinder triple-expansion. The housings, or supports are for each cylinder an inverted cast steel Y frame at the back, and two 8-inch forged hollow steel columns in front. The valves are all of the single ported piston type, there being one for each high pressure cylinder, two for each intermediate, and four for each low pressure cylinder. The link motion is of the Stevenson type, double bar. Independent adjustable cut-off blocks are fitted to each link, with a range from .44 to .74 of stroke. There is a steam float lever reversing gear, which can also be adjusted to work by hand pump and oil, there being a common piston rod for both steam and oil pistons and cylinders. The operation of reversing by steam is nearly instantaneous.

The high pressure valve takes steam in the center through a 15-inch steam pipe. It exhausts at ends to the intermediate valves through four short 14-inch bends, (two on each side) which pipes form the first receiver. The intermediate valves exhaust from the center through a single 23-inch pipe (reducing to a long 19-inch pipe between the two ends of the low pressure cylinder), this forming the second receiver. The low pressure valves exhaust to the main condenser from the center through two 22½-inch pipes. The main steam pipe from the boilers to the engines is of lap welded steel, ⅜-inch thick and 20 inches in diameter as far as the first engine branches.

The data of one main engine follows: Number of cylinders three; diameter of cylinders, H. P., 42 inches; I. P., 59 inches; L. P. 92 inches; stroke, 42 inches; diameter of valves, H. P. (one) 18 inches; I. P., (two) 23 inches; L. P. (four) 21 inches; diameter of piston rods (all) 8⅛ inches; length of connecting rods, center to center, 84 inches; distance between centers of cylinders, 9 feet 7½ inches.

The crank shafts are interchangeable, there being a separate section for each crank. The thrust and propeller shafting is 15¾ inches diameter and the axial hole 7½ inches, tapering to 4½ at propeller ends. The center shaft runs parallel to the keel, while the wing shafts are inclined upwards, at about 1 foot 11 inches in 100 feet, and also inclined outwards at about 3 feet 10¼ inches in 100 feet from the center line. This brings the position of the center of each wing propeller 13 feet 5 inches forward, 3 feet 3 inches above, and 12 feet 5 inches outboard of that of the center screw. The lines of the wing shafts if projected would meet at about 4 feet 9 inches above the base line, and 156 feet forward of the center of gravity, between frames No. 16 and No. 17. Each engine has a thrust bearing of the horseshoe pattern, fitting eleven collars turned on the thrust shafts. These collars are 3¾ inches deep and 2 inches thick. The thrust surface of each shaft is 2,527 square inches.

There is one main condenser in each engine room. They are cylindrical, and made of composition throughout, 14 feet 9 inches long and 6 feet 7 inches diameter. Steam is outside of tubes. The two auxiliary condensers were furnished by the Wheeler Condenser and Engineering Co.

There are three double main air pumps, Blake vertical inverted twin cylinder, and two centrifugal pumps, for each main condenser, driven by two 10 inch by 6 inch simple engines coupled together. These pumps are also connected to draw from the bilge and main drains, and their discharge may be direct overboard, if desired, without its passing through the condensers. The capacity from the bilge is 6,750 gallons per minute for each pump, aggregating 40,500 gallons per minute for the six pumps and about equalling an amount of water which would enter through a 27-inch hole in the ship's bottom. Of the other steam pumps in the ship, there are eleven with bilge connections having an aggregate capacity of 7,400 gallons per minute, which added to that of the circulating pumps makes a grand total of 47,900 gallons per minute. The pumps connected with the evapo-

rators are of the Davidson pattern; all the others are of Blake design except the air and circulatiug pumps on auxiliary condensers, which are Knowles.

The screw propellers are of the modified Griffith design, true screw, three bladed, with adjustable pitch ranging from 19 feet 6 inches to 22 feet. The material is manganese bronze, and the diameter of the hubs is about one-third the diameter of the wheel. The center and starboard screws are right hand and the port screw is left hand. The center screw is 14 feet in diameter, while the wing ones are one foot greater, although the helicoidal area is kept about equal by widening the blades of the former.

	Wing Screws.	*Center Screw.*
Diameter of propeller, feet	15	14
Diameter of hub, feet and inches	4–11½	
Pitch as set, feet and inches	22–0	21–6
Helicoidal area one propeller, square feet	53.7	53 28
Disc area one propeller, square feet	176.7	153.9
Ratio pitch to diameter (as set)	1.46 to 1	1.55 to 1
Immersion of upper edge of blade (normal draught), feet and inches	5–5	9–1

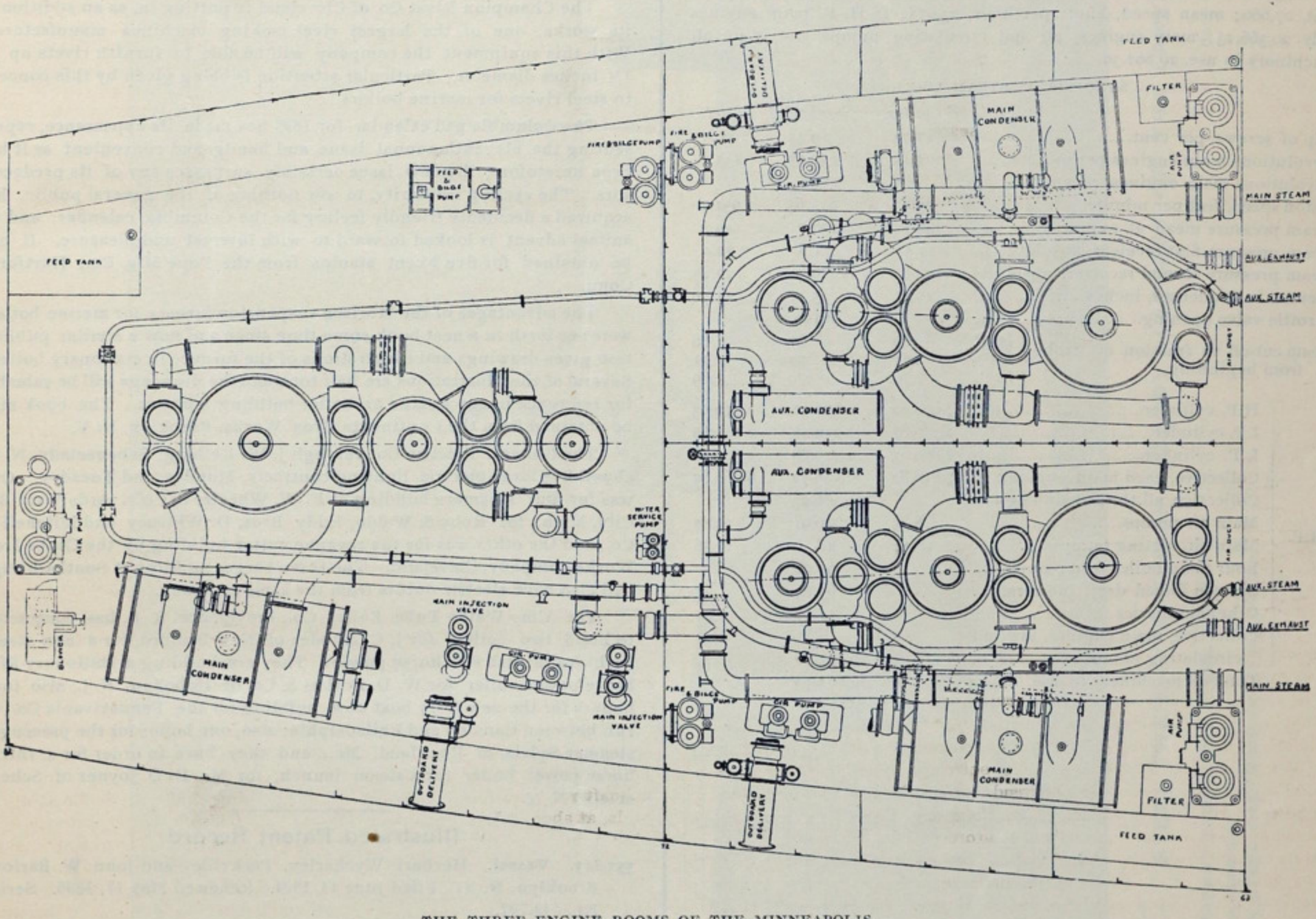
Each blade weighs about 3,900 pounds, or 11,700 pounds for the blades of each screw, and each hub about 7,200 pounds. making nearly 19,000 pounds for each propeller complete.

There are eight main and two auxiliary cylindrical boilers. The six after main boilers are the largest of modern marine types, being 15 feet 9 inches in diameter and 20 feet long—two feet longer than the largest boilers in the Columbia, though of the same diameter. The other boilers are similar to the Columbia's, but by reason of the increased size of the above six the total heating surface of the main boilers is 48,194.54 square feet, and the total grate surface 1,456,2 square feet, against 43,268.13 and 1,344 square feet respectively for the Columbia. This greater boiler power is the only important difference in the machinery of the two ships. Each of these larger main boilers weighs about 72 tons empty and without fittings, and contains about 40 tons of water at steaming level. All the main boilers have flat ends, but the auxiliary boilers have the ends curved back at the top to a radius of 2 feet 2½ inches. The latter boilers are in separate open fire rooms on the protective deck. The Cone patent rocking grate is used in all the furnaces. The main boilers are double ended with four furnaces at each end. The two adjacent furnaces on each side of each end have a common combustion chamber. The auxiliary boilers are single ended and have but two furnaces each. All the furnaces are of corrugated steel. The main boiler shells are in three lapped courses, with three sheets in each course, butted, and strapped inside and out.

There is one quadruple safety valve (each valve four inches in diameter), on each main boiler, and these, as well as the stop valves, can be operatnd from the berth deck. All the material is mild steel, including the tubes. The latter were rolled by the Reading Iron Co. from open-hearth steel especially made for the purpose by the Pottstown Iron Co., and are most excellent in finish and quality.

Data for one boiler follows: Shell, length, 20 feet; diameter, 15 feet 9 inches; thickness, $1\frac{11}{32}$ inches; number courses, 3; sheets in course, 3; furnaces, number, 8; diameter (least inside), 40 inches; diameter (greatest inside), 42⅞ inches; thickness, $\frac{9}{16}$ inches; length of grates, 84 inches; number of grate bars each furnace, 7; tubes, number of ordinary No. 12, B. W. G., 948; tube heating surface, square feet, 5,539.89.

Totals for main boilers are: Heating surface, 48,104.54 square feet; grate surface, 1,456.2 square feet; area through tubes, 209.8 square feet; volume steam space, 6,806.6; area water surface, 2,060.6 square feet; net area two main smoke pipes, 196 square feet; aggregate length (exposed) of all tubes, 12.7 miles.



THE THREE ENGINE ROOMS OF THE MINNEAPOLIS.

Sixteen 60-inch Sturtevant blowers are used for forced draft, two blowers being placed in front of each end of each main boiler overhead, drawing air through air ducts from above decks, and each blower having a capacity of 10,200 cubic feet of air per minute, with an air pressure of one inch of water in the fire rooms.

The electric plant of the Minneapolis consists of three 24 kilowatt direct connected generating sets, having the generators directly connected to a double cylinder simple vertical engine. The capacity of each generator is 300 amperes at 80 volts. These sets are built by the General Electric Company especially for marine service, and, of course, are constructed to meet requirements of the government specifications. The controlling and measuring instrumcnts are mounted on a navy standard slate switchboard placed near the generators. Every appliance is of standard type. The porcelain used is manufactnred at the General Electric Company's own porcelain factory, and is of the hard white vitrified variety which has been found to satisfy the government insulation requirements as no other has heretofore done. The vessel is lighted by 500 incandescent lights placed in regular government standard fixtures. In addition there are two search lights one having a reflector twenty-four inches in diameter, the other with a thirty-

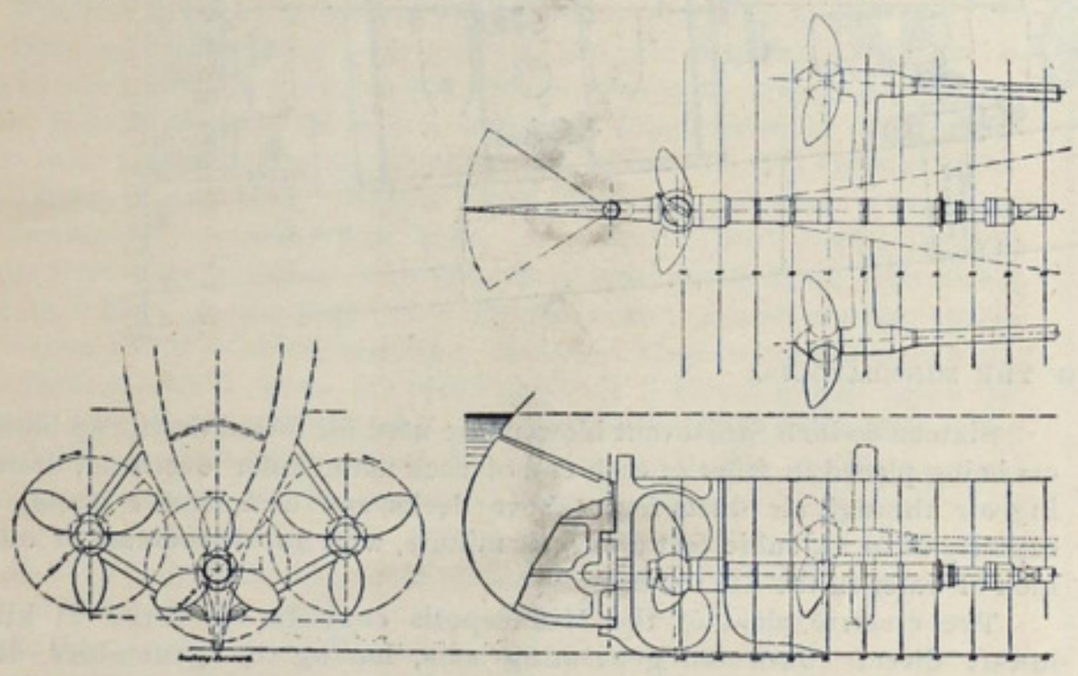
inch reflector. These are controlled by hand. They were constructed at the Schenectady works of the company and in workmanship and efficiency are equal to the best search lights of European manufacture. The signalling is also effected by electricity, the signalling apparatus consisting of four double lanterns each containing one red and one white incandescent lamp. The various combinations are made by throwing the current into the several lamps at will, by means of a circular dial around which moves an arm pivoted at the dial center. The motor work is confined at present to the operation of the ventilators. Of these there are four sets. Two are stationary and are each driven by a two horse power motor, while the other two are portable and are operated by one-quarter-horse power motors. The motors being mounted directly on the axle of the blower the combination has that compactness which is so necessary in the restricted limits of a battle ship.

CONTRACT TRIAL DATA.

Draught of water, beginning of trial, forward, feet and inches, 22–1; aft, feet and inches, 23–4; end of trial, forward, feet and inches, 21–4; aft, feet and inches, 23–3; mean, forward feet and inches, 21–8½; aft, feet and inches, 23–3½; average on trial, feet and inches, 22–6; displacement mean tons, 7,387; area immersed midship section, 1,125; wetted surface, square feet, 27,660; mean speed, knots per hour, 23,073; I. H. P. main engines only 20,366.23; main engines, air and circulating pumps, 20,453.40; all machinery in use, 20,862.30.

SYNOPSIS OF STEAM LOG.

		Center.	*Starboard.*	*Port.*
Slip of screws, per cent		17.73	19.44	20.15
Revolutions main engines per minute		132.19	131.95	133.1
Revolutions main engines, mean			132.4	
Piston speed, feet per minute		925.33	923.65	931.7
Steam pressure mean at engines		148.1	150.7	149
Steam pressure first receiver, absolute		72.5	74.8	72.9
Steam pressure second receiver, absolute		24.6	26.3	27.4
Vacuum in condenser, inches		25.31	25.11	24.76
Throttle valve opening			Wide.	
Steam cut-off in fraction of stroke from beginning,	H. P.	.62	.67	.66
	I. P.	.71	.72	.71
	L. P.	.70	.70	.69
I.H.P.	H.P. cylinder	1,978.92	1,876.36	1,779.93
	I.P. cylinder	2,370.87	2,239.48	2,181.18
	L.P. cylinder	2,869.03	2,470.88	2,599.58
	Collective, each main engine	7,218.82	6,586.72	6,560.69
	Collective, all three main engines		20,366.23	
	Main air pumps	8.39	10.91	13.87
	Main circulating pumps	18.44	18.	17.56
	Four main boiler feed pumps		90.96	
	Sixteen forced draft blowers		263.04	
	Other auxiliaries		54.90	
	Collective, main engines, air and circulating pumps		20,453.40	
	Total all machinery in use		20,862.30	



SHOWING POSITION OF MINNEAPOLIS THREE SCREWS.

Some Features of the Minneapolis.

All the steam surfaces, pipes etc., of the cruiser Minneapolis are covered with magnesia. In fact this covering has been quite generally adopted in the navy as well as in the merchant service. An idea of the amount of piping and steam furnaces in a war ship with three engines can be had from the fact that the Philadelphia agents of the Keasbey & Mattison Co. furnished 15,000 square feet magnesia blocks for the Minneapolis. On the lakes the Detroit Dry Dock Co., Chicago Ship Building Co. and F. W. Wheeler & Co., use magnesia very extensively and it has given entire satisfaction. The prominent lake agents are Frances Line, Cleveland, O.; S. P. Conklin, Detroit, Mich.; F. Sprinkman, Milwaukee, Wis.; Watch & Wyette, Chicago and R. A. Keasbey, Buffalo.

It is interesting to note that in making her wonderful speed Pocahontas coal was used in the boilers of the Minneapolis, and the heat producing qualities of this coal are such that it was not hand picked as is usually done for trial trips.

The following concerns furnished auxiliary machinery for the Minneapolis: Geo. F. Blake Mfg. Co. New York, N. Y., pumping machinery; General Electric Co. Schenectady. N. Y., electric installation; Wheeler Condenser and Engineering Co. New York, N. Y., auxiliary condenser; American Ship Windlass Co. Providence, R. I., windlasses; Williamson Bros, Philadelphia, Pa., steering engines; B. F. Sturtevant Co. Boston, Mass., blowing engines; H. B. Roelker, 41 Maiden lane, New York, dense air machine; C. H. Cory & Son, 278 Division street, New York, telegraphs.

Trade Notes.

The Berlin Iron Bridge Co. of East Berlin, Conn., has just completed for the H. W. Johns Mfg. Co., Brooklyn, N. Y., a new dryer house which is built entirely of steel.

The Champion Rivet Co. of Cleveland is putting in, as an addition to its works, one of the largest rivet making machines manufactured. With this equipment the company will be able to furnish rivets up to 1¼ inches diameter. Particular attention is being given by this concern to steel rivets for marine boilers.

The Columbia pad calendar for 1896 has made its appearance, representing the eleventh annual issue, and handy and convenient as it has been heretofore, the new issue certainly surpasses any of its predecessors. The cycling fraternity, to say nothing of the general public, has acquired a decidedly friendly feeling for the Columbia calendar, and its annual advent is looked forward to with interest and pleasure. It can be obtained for five 2-cent stamps from the Pope Mfg. Co., Hartford, Conn.

The advantages of the Morison suspension furnace for marine boilers were set forth in a neat book some time since and now a similar publication gives drawings and illustrations of the furnace in stationary boilers. Several of the illustrations are half tone and the drawings will be valuable for reference in any engine or boiler building concern. The book may be obtained frem the Continental Iron Works, Brooklyn, N. Y.

The General Electric Co. through J. W. Kellogg, Schenectady, N. Y. closed five large electric lighting contracts, Monday and Tuesday. One was for four steamers building at F. W. Wheeler & Co's. yards West Bay City, Mich , for Roby & Waldo, Eddy Bros, D. Whitney and Mitchell & Co., and the other was for the revenue cutter building by the Globe Iron Works Company, Cleveland. The three barges building at South Chicago will also have electric outfits from the same company.

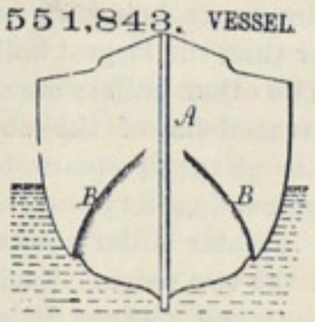
The Almy Water Tube Boiler Co., Providence, R. I., has contracted to build two boilers for J. C. Rhodes of New Bedford, for a new steam yacht, to furnish 500 horse power. They are building a stationary fifty horse power boiler for W. D. Forbes & Co. of Hoboken, N. J.; also four boilers for the new ferry boat now building for the Pennsylvania Co., to run between Camden and Philadelphia; also, one boiler for the passenger steamer Sylvia, of Rockland, Me., and they have an order for a thirty horse power boiler for a steam launch, for Mr. E. D. Joyner of Schenectady, N. Y.

Illustrated Patent Record.

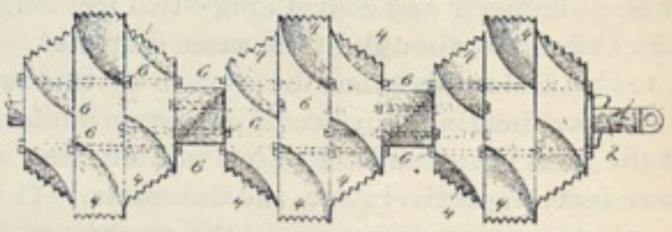
551,843. **Vessel.** Herbert Wycherley, Parkville, and John W. Barlow, Brooklyn, N. Y. Filed June 14, 1894. Renewed May 17, 1895. Serial No. 549,707.

Claim. A vessel having channels in its surface forming downwardly inclined and curved lifters at each side of the bow only to act only on the water as it is parted by the bow to elevate the bow of the vessel by the movement through the water.

551,843. VESSEL.

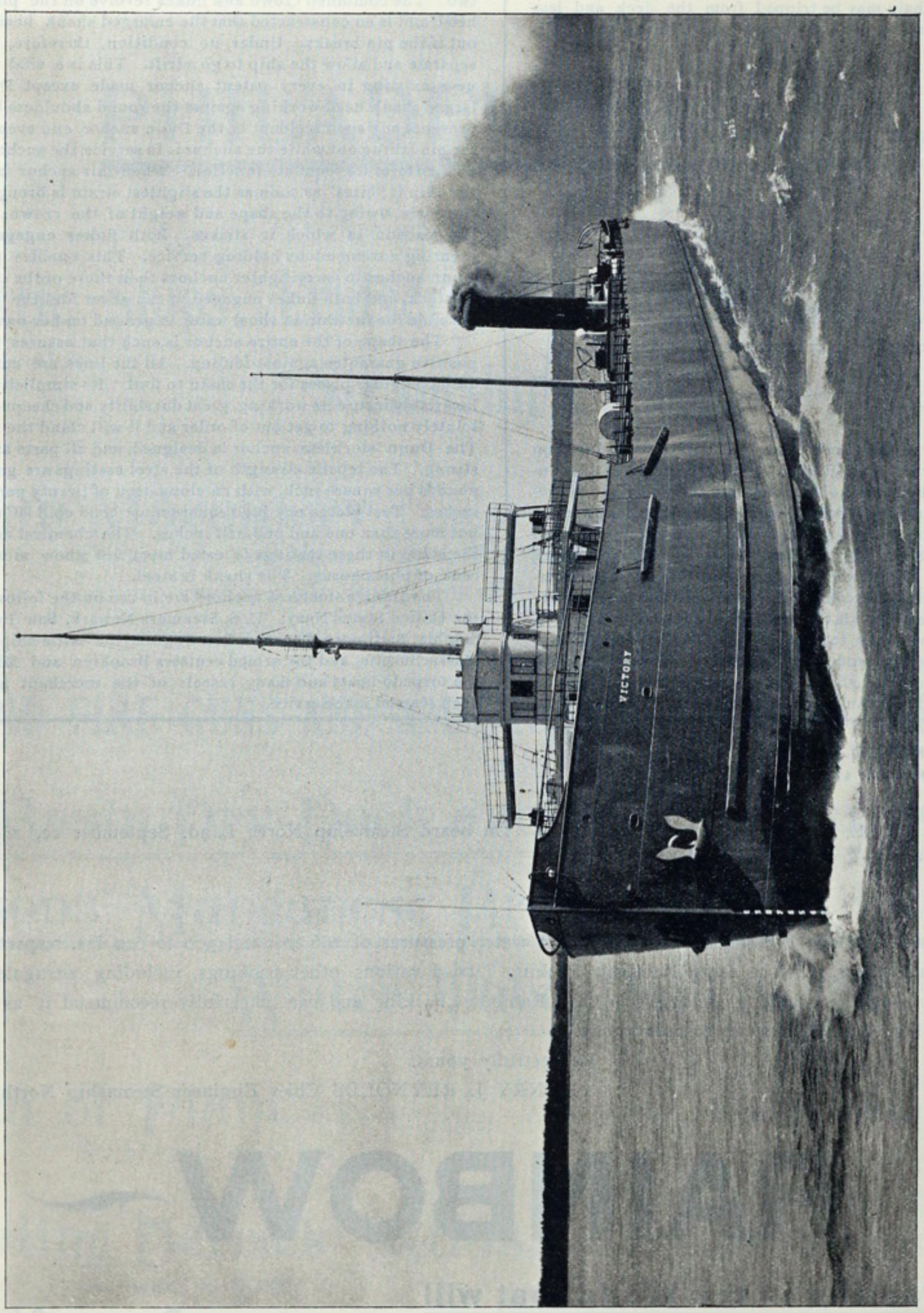


551,962. DREDGING-MACHINE.



551,962. **Dredging Machine.** John W. Henderson, Tunica, Miss. Filed July 15, 1893. Serial No. 480,677.

Claim. In a device for dredging rivers, a rod or shaft having a chain or cable connected thereto, a revolving device situated around said rod or shaft, said revolving device constructed of sections bolted together and forming blades or cutters.



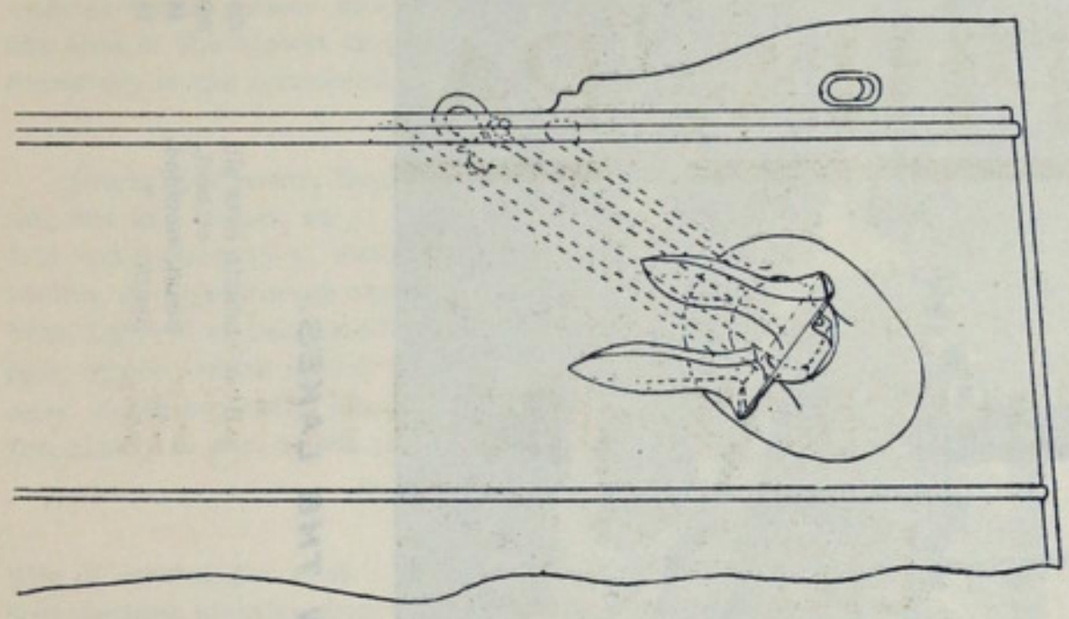
STEEL FREIGHT STEAMER VICTORY—LARGEST ON THE LAKES.

Hull—Length over all,	400 feet.
" of keel,	380 "
Beam, moulded,	48 "
Depth, "	28 "

FITTED WITH DUNN PATENT STOCKLESS STEEL ANCHORS.
FOR PARTICULARS ADDRESS,
AMERICAN STEEL CASTINGS CO., THURLOW, PA.

Anchors for Lake Service.

Probably not a half dozen of the modern steel freight steamers on the lakes have anything but stockless anchors. When first introduced their utility was at once recognized for the requirements of the lake trade. The greatest advantage was through being able to cast anchor in a minute. If anything goes wrong with the steamer's machinery in the rivers, there is no need of drifting ashore or into some boat following close, if the steamer is fitted with stockless anchors. Some steamers have an arrangement by which the chain may be tripped from the deck and less then two minutes is required to get the anchor out. This is very desirable sometimes, especially in the Sault river. When first introduced on the lakes they were imported from England and the price and inconvenience in getting them here were objections, but not sufficient to prevent their adoption. During the last few seasons an American anchor has come into use on the lakes and ought to be found on every new ship turned out this winter. Some shipbuilders have objected that a larger hawse-pipe is required for the American anchor, but this has been remedied and all other objections overcome. It is no doubt the best anchor of the kind, for two reasons. One is the mechanical construction, which makes it impossible for the shank to become detatched from the flukes, and the other is its grappling and holding ability. Some stockless anchors slip and depend on the shank pin alone for overcoming the strain, but if the pin in the Dunn anchor should break or pull out the shank and flukes would remain intact. The form of flukes is different from any other stockless anchor and insures the grappling of both flukes.



The Zenith City and the Victory, the two largest steamers on the lakes, are fitted with Dunn anchors, as is shown by the illustration on page 17, and the manner of stowing in the hawse pipe is shown by an illustration herewith.

The Dunn patent stockless anchor is composed of only three parts, a combined crown and flukes, a shank and a steel pin connecting the two. The combined crown and flukes revolve on the pin at the shank head, and is so constructed that the enlarged shank head can not draw out if the pin breaks. Under no condition, therefore, can the anchor separate and allow the ship to go adrift. This is a vital point of weakness existing in every patent anchor made except Dunn's. The enlarged shank head working against the round shoulders inside the crown prevents any such accident in the Dunn anchor, and even in the event of the pin falling out while the anchor is in service, the anchor will still work and perform its requisite function. When this anchor is "let go" from the ship it "bites" as soon as the slightest strain is brought to bear upon the chain, owing to the shape and weight of the crown, irrespective of the position in which it strikes. Both flukes engage at once, thus securing a tremendous holding service. This enables ships using the Dunn anchor to carry lighter anchors than those of the old type. Having no stock, and both flukes engaged, it can never foul the chain, nor is it possible for the ship in shoal water to ground on her own anchor.

The shape of the entire anchor is such that assures the customer a positive guarantee against fouling. All the lines are curved and there are no angular places for the chain to foul. Its simplicity and few parts invariably insure its working, great durability and cheapness. There is absolutely nothing to get out of order and it will stand the roughest usage. The Dunn stockless anchor is designed, and all parts are made equally strong. The tensile strength of the steel castings are guaranteed 65,000 pounds per square inch, with an elongation of twenty per cent. in eight inches. Test pieces one inch square must bend cold 90° over a radius of not more than one and one-half inches. The chemical analysis to which the metal in these castings is tested must not show more than .06 per cent. of phosphorus. The shank is steel.

The Dunn's stockless anchors are in use on the following vessels in the United States Navy: U. S. Steamers Newark, San Francisco, Philadelphia, Baltimore, Concord, Bennington; the battle-ships Indiana, Iowa, Massachusetts, and the armed cruisers Brooklyn and Minneapolis, also the torpedo boats and many vessels of the merchant marine, both in deep sea and lake service.

NORTHERN STEAMSHIP CO.
GREAT NORTHERN RAILWAY LINE.

MR. CHARLES H. DALE,
PRESIDENT PEERLESS RUBBER MFG. CO.,
NEW YORK CITY.

On board Steamship North Land, September 12, 1895.

DEAR SIR:

I have used Rainbow Packing for steam and hot water pressures of 266 lbs. and 500 to 600 lbs. respectively, and find it superior to all others. Before using Rainbow Packing I tried various other packings, including corrugated copper, and found that they would not hold. I therefore tried Rainbow Packing and can cheerfully recommend it as being the only packing for all high pressures in the market to-day.

Respectfully yours,
HENRY J. REYNOLDS, Chief Engineer Steamship North Land.

RAINBOW

Is the only Packing in the World that will Successfully hold High Pressures.

Beware of Imitations.

MANUFACTURED EXCLUSIVELY BY

The Peerless Rubber Manufacturing Co.

970 Old Colony Bldg., CHICAGO. **16 Warren Street, NEW YORK.**

CRAMP'S SHIP YARD,

PHILADELPHIA, PA.

Battle Ships, Cruisers, Passenger and Freight Steamships, Etc.

Steam Machinery of every description, including boilers and all equipment, Marine Engines of any desired power, Mining Machinery, Hydraulic Plants, both for pumping and for power, Tank Works; in short, every device or appliance embraced in the domain of applied mechanics.

RAPID FIRE GUNS AND AMMUNITION. GUN CARRIAGES.

Basin Dry Dock and Marine Railway.

Parsons' Manganese Bronze and White Brass.

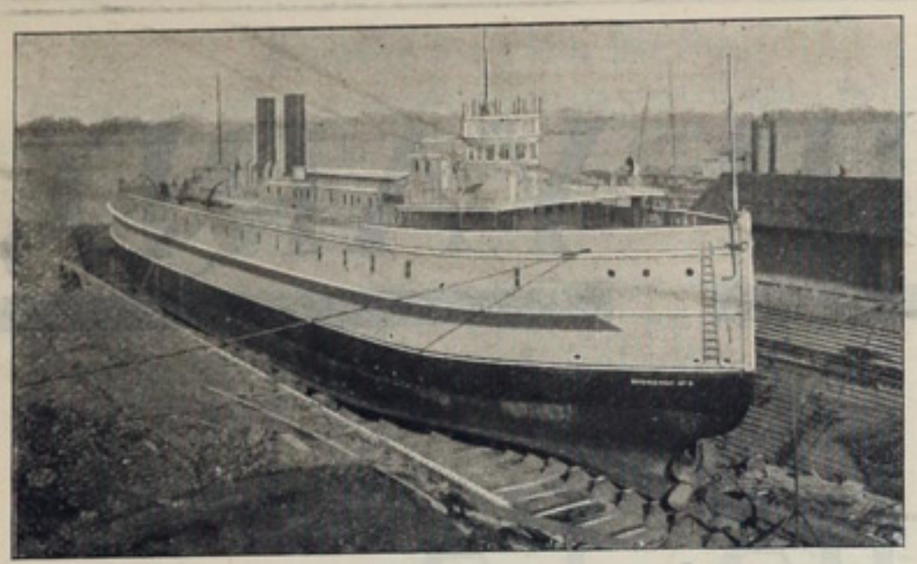
Water Tube Boilers. (NICLAUSSE, MOSHER, YARROW.)

Area of Plant—thirty-two acres. Area covered by buildings, fifteen acres. Delaware River front, 1,543 feet.

Floating Derrick "Atlas," capacity 130 tons, with 60 feet hoist, and 36 feet out-hang of boom.

Number of Men Employed, about 6,000 in all departments.

At once, the greatest and most complete Ship and Engine Building Establishment in the Western Hemisphere.



Shenango No. 2, 300 feet long, 54 feet beam.

CRAIG SHIP BUILDING CO.

TOLEDO, OHIO,

Metal and Wooden Ship Builders.

New Dry Dock—450 feet long, 110 feet wide on top, 55 feet wide on bottom, 16 feet of Water on Sill.

Repairs to Metal and Wooden Ships A Specialty.

The Roberts Boiler Co.

Have built about..... 800 BOILERS TO DATE for...

Launches, Yachts, Passenger and Freight Steamers, Dredges, Tugs, Stern-Wheelers, Canalers; also for Navy Department, War Department, Treasury Department, Light-House Board and Revenue Cutter Service: also for N. Y. Dock Department and N. Y. Harbor Quartermaster.

...SAFETY AND ECONOMY...

Never killed a man or had a serious accident. $250,000 capital. Works covering 29,000 square feet of ground. Never had a boiler returned on account of dissatisfaction. Every Boiler Warranted. All material made specially for our use. All boilers tested at 500 pounds hydrostatic pressure and 250 pounds of steam before shipping. Workmanship strictly first-class. All joints screwed and reliable. No expanded joints. State your requirements and we will furnish specifications. Correspondence solicited.

THE ROBERTS SAFETY WATER TUBE BOILER CO.,
39 and 41 Cortlandt Street, New York City.
Works, Red Bank, N. J.

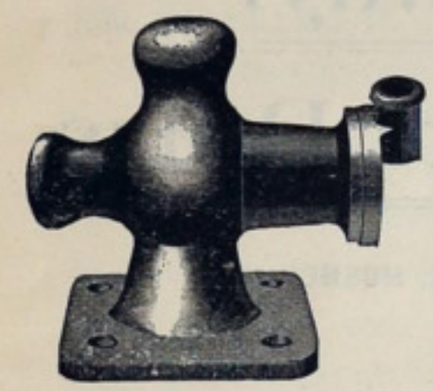
NAUTICAL WATCH CHAIN.

Solid Gold. Ship-shape in every detail.
Send for Descriptive Circular.

MORGAN A. ROBERTSON,
26 John Street, NEW YORK.

Enos Combined Bitt, Winch and Sheet Holder.

Patented U. S. A., England and Canada.



Takes the place of wooden or iron bitts and forms a Combination Bitt and Winch. Takes up less room than the ordinary bitt. Can be used to great advantage as a Windlass or Sheet Holder on Yachts. An examination will convince you of the many uses to which it can be put.

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Upson, Walton & Co., Cleveland, Ohio.
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M. I. Wilcox Cordage & Supply Co., Toledo, O.
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And by Ship Chandlers in every seaport city lake port and town.

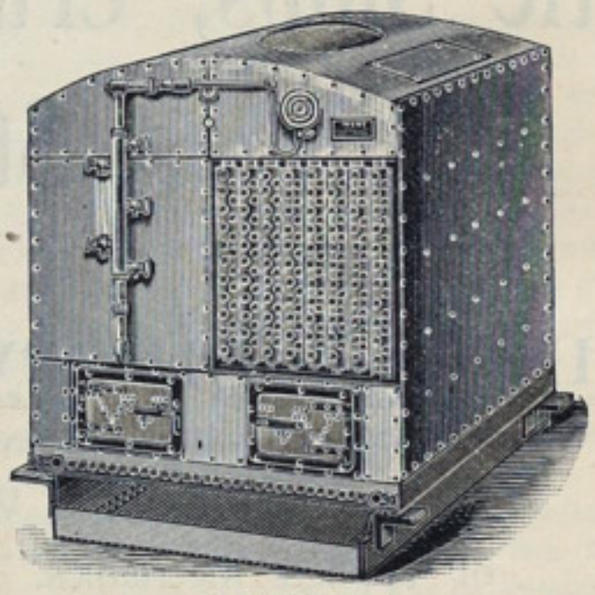
THE ENOS SHEET HOLDER CO.
Manufacturers and Proprietors, PEABODY, MASS

H. E. STEVENS. J. T. MEAD. LEWIS S. PRESLEY
BUCKEYE STEAM FITTING CO. Manufacturers of Improved Giant Flue Scraper.
STEAM FITTERS. ENGINEERS' SUPPLIES.
Phone 4058, 117 River Street, CLEVELAND, OHIO.

THE WEST PATENT

Safety Water Tube Boiler

Compact and Simple. Safe and Reliable.



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GAS ENGINE & POWER CO.

MORRIS HEIGHTS—ON THE HARLEM,
New York City.

For Sale Cheap—

Several tugs with engines all the way from 10x12 to 20x20 and all in good repair. For full particulars address:

INMAN TUG LINE,
B. B. INMAN, Manager, Duluth, Minn.

Jeffery's Marine Glue

For Paving Seams of Decks and other purposes.

L. W. FERDINAND & CO., Boston, Mass.
Send for Circular.

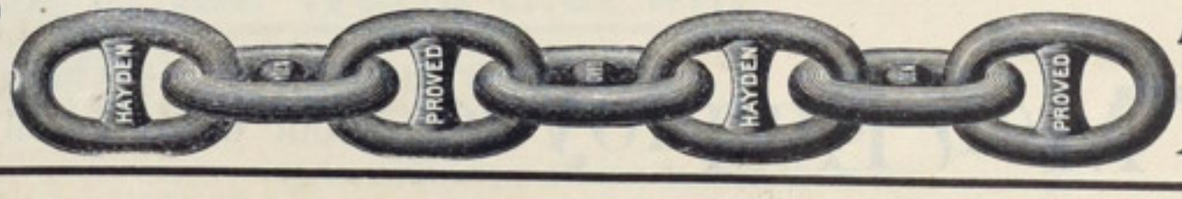
For Sale A Double Furnace Marine Boiler,

11 feet diameter by 14 feet long, and 120 pounds steam.
In good condition, built by the Globe Iron Works, Cleveland, in 1891.

Address: GOODRICH TRANSPORTATION CO., CHICAGO

Chain Department ✻ P. HAYDEN S. H. CO. ✻ Columbus, Ohio.

Our Chain in use on the Largest Steamers on the Lakes:
The Zenith City, Victory, North West and North Land, and many others.



All kinds of Chain—Stud and Close Link, Cable Chains.
Write for Prices.

AMERICAN SHIP WINDLASS CO.

P. O. BOX 53, PROVIDENCE, R. I.

BUILDERS OF THE

"Providence" Windlasses and Capstans

350 STYLES AND SIZES.
OVER 5000 IN USE.

SEND FOR CATALOGUE.

FRANK S. MANTON, AGENT.

The Marine Manufacturing & Supply Co. 158 South St., NEW YORK.

Manufacturers and dealers in Ship Machinery, Windlasses, Capstans, Winches, Pumps, Brass Work, "Monitor" Side and Deck Lights, Cannon, Rails, Stanchions.

Ship Chandlery and Engineers Supplies, Cordage, Oakum, Wire Rope, Anchors, Chain, FLAGS AND SIGNALS, Hose, Packing, Oils, Waste, etc., etc.

Estimates furnished for complete outfits for vessels.

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89 Fulton St., Boston, Mass.

MANUFACTURERS OF

Torches and Liquids for Lights of Various Colors,

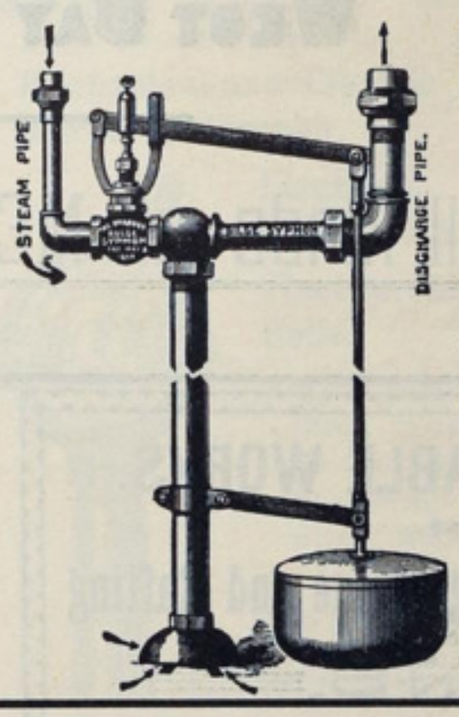
For Signal Lights and Illuminations of all kinds.
Blue Flash Lights a Specialy.

We call the attention of masters of vessels to the efficiency of our patented flare-up or flash light torch. It can be used with kerosene or spirits of turpentine. Its superiority over all other kinds of torches is that it is indestructible. Being filled with asbestos, it will last for years, and is ready for use at any moment. It gives a white flame three to five feet high, burns less liquid than any ordinary torch of the samc size or larger. The combustion is so perfect that very little smoke is made, and the flame is therefore much brighter. At night you can wigwag with this torch. Rain or spray will not extinguish it, and the stronger the wind the better it burns. We have also a **Blue, Green and Red Burning Liquid,** to make any code of signals required. Yachtsmen will find this of immense value for signaling.

Lake Agents: { The Upson-Walton Co., Cleveland, O. / H. Channon Co., Chicago, Ill.

Price of Flare-up Light, $3.50

THE BRAENDER AUTOMATIC BILGE SYPHON,



Always on Watch,

"SHIP AHOY."

It never tires, or goes to sleep, and is reliable at all times.

It is the best, cheapest and surest way of keeping your vessel dry.

They are indorsed by leading Engineers throughout the country.

They commend themselves wherever placed.

A dry bottom in ship's holds gains speed, which is equal to money.

By giving it a trial, it will speak for itself.

Write for circular,

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FORGED STEEL WATER-TUBE MARINE BOILER,

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BOILERS SOLD TO STEAMERS

NERO,	**ALGERIE,**	**ELEANOR,**	**REVERIE,**	**TROPHY,**	**SCOTTISH HERO,**
TURRET CROWN,	**HERO,**	**TURRETT CAPE,**	**SENECA,**	**PRESIDENT,**	**ZENITH CITY.**

Under construction :—For Plant Line Steamship, building by the Newport News Shipbuilding and Dry Dock Co., eight (8) boilers with 20,300 sq. ft. heating surface and 460 sq. ft. grate surface, and pressure 200 lbs. per sq. in.; also boilers for new steamer building by the Cleveland Ship Building Co. for the Zenith Transit Co. (second order) and large tug for Duluth & Iron Range Railroad.

O. S. Richardson Fueling Co.

FUELING DOCKS:
FOOT OF NORTH MARKET ST.
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STORAGE DOCKS FOR ANTHRACITE:
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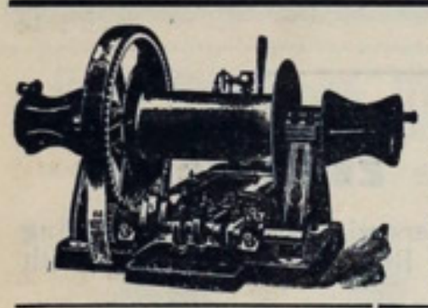

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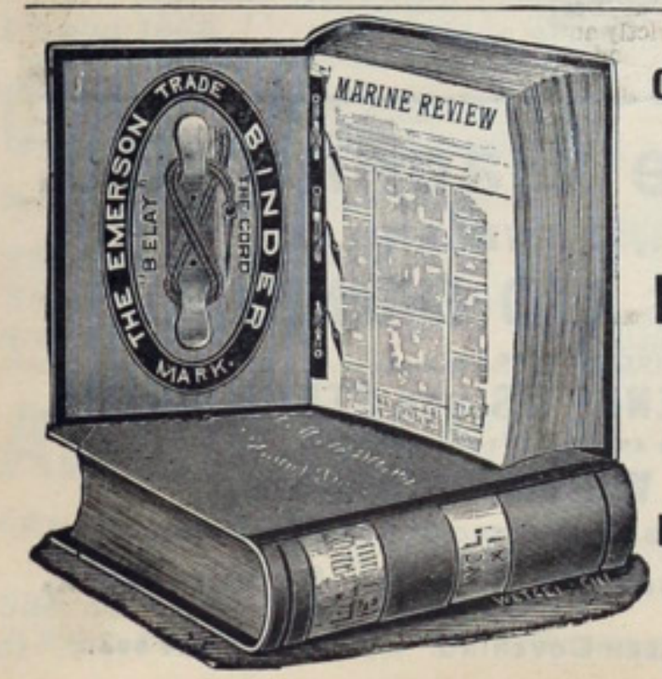

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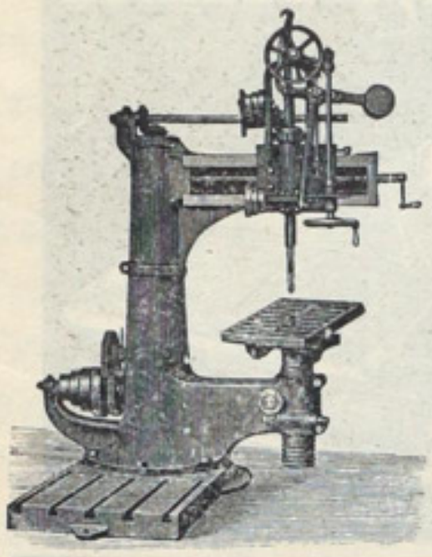

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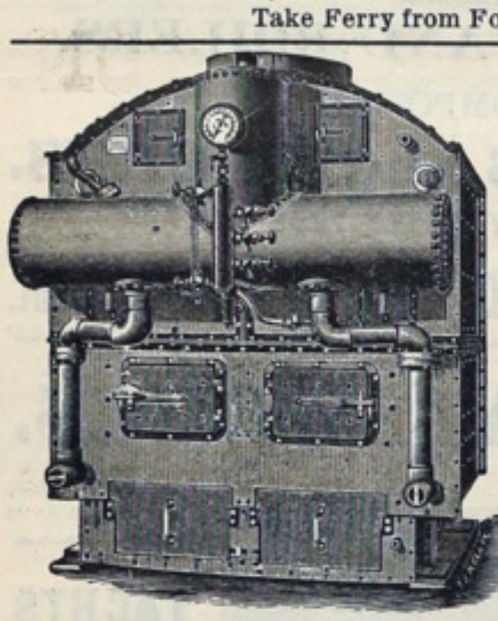

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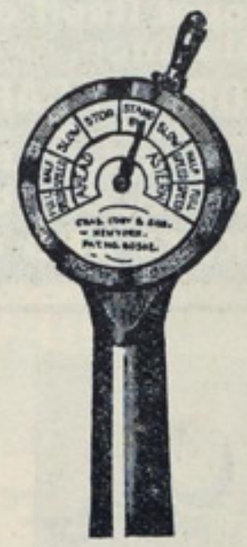

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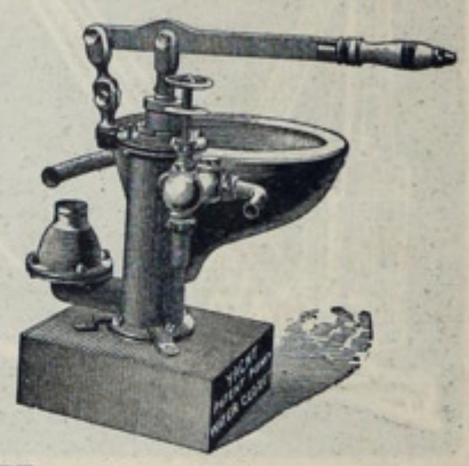

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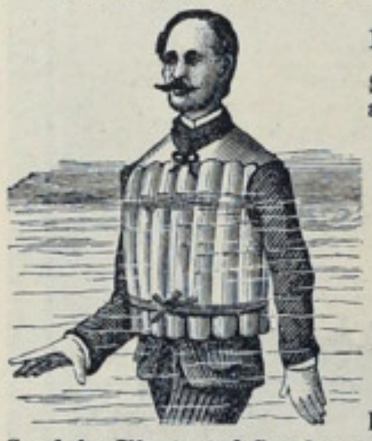

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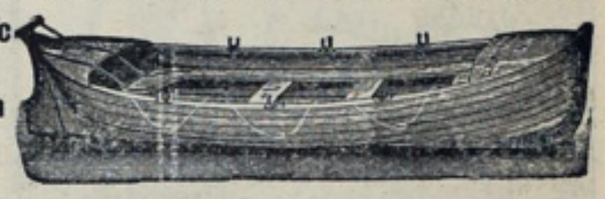

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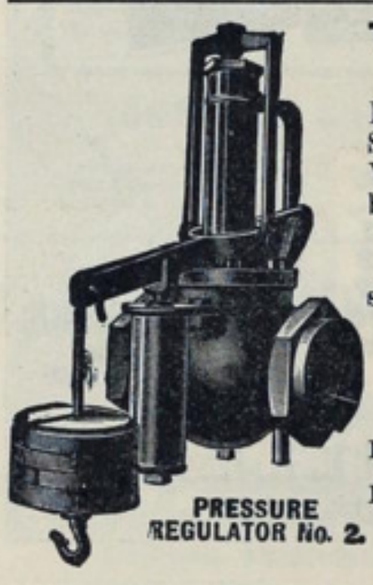

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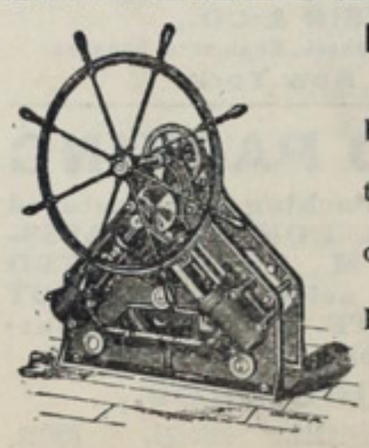

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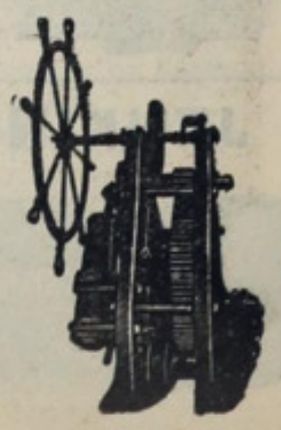

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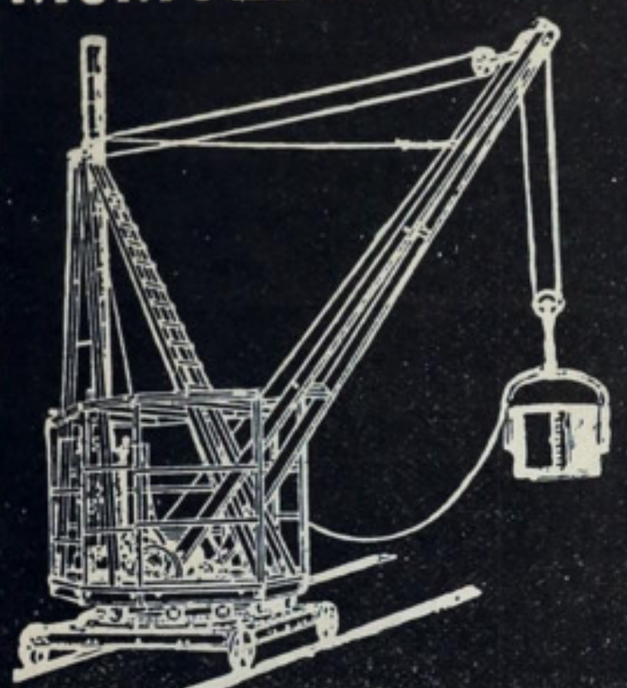

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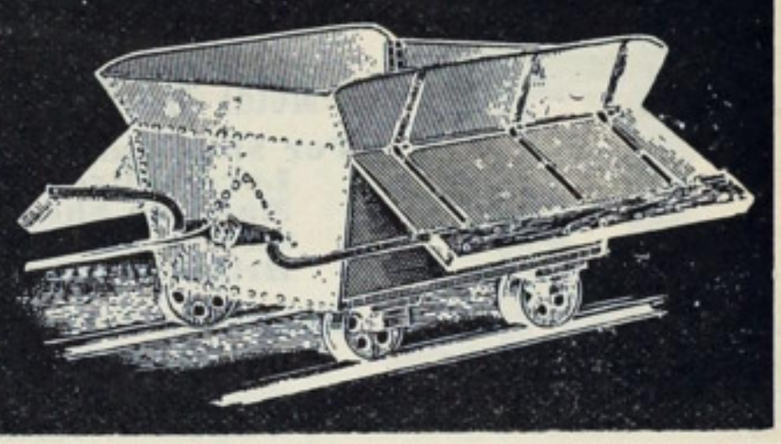

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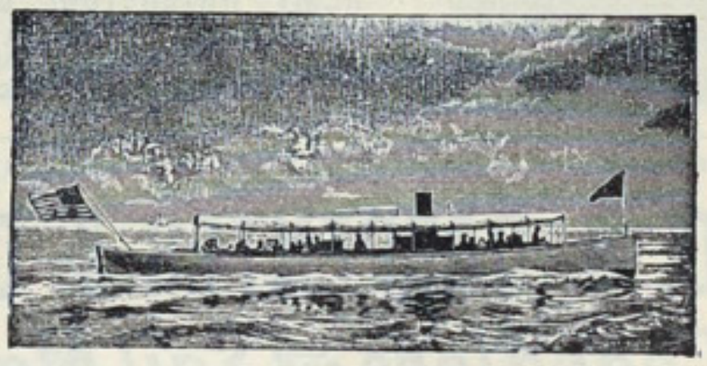

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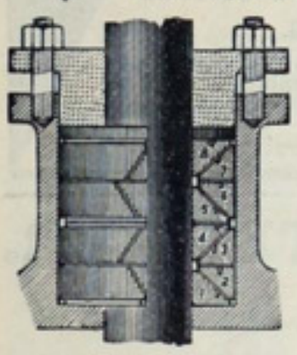

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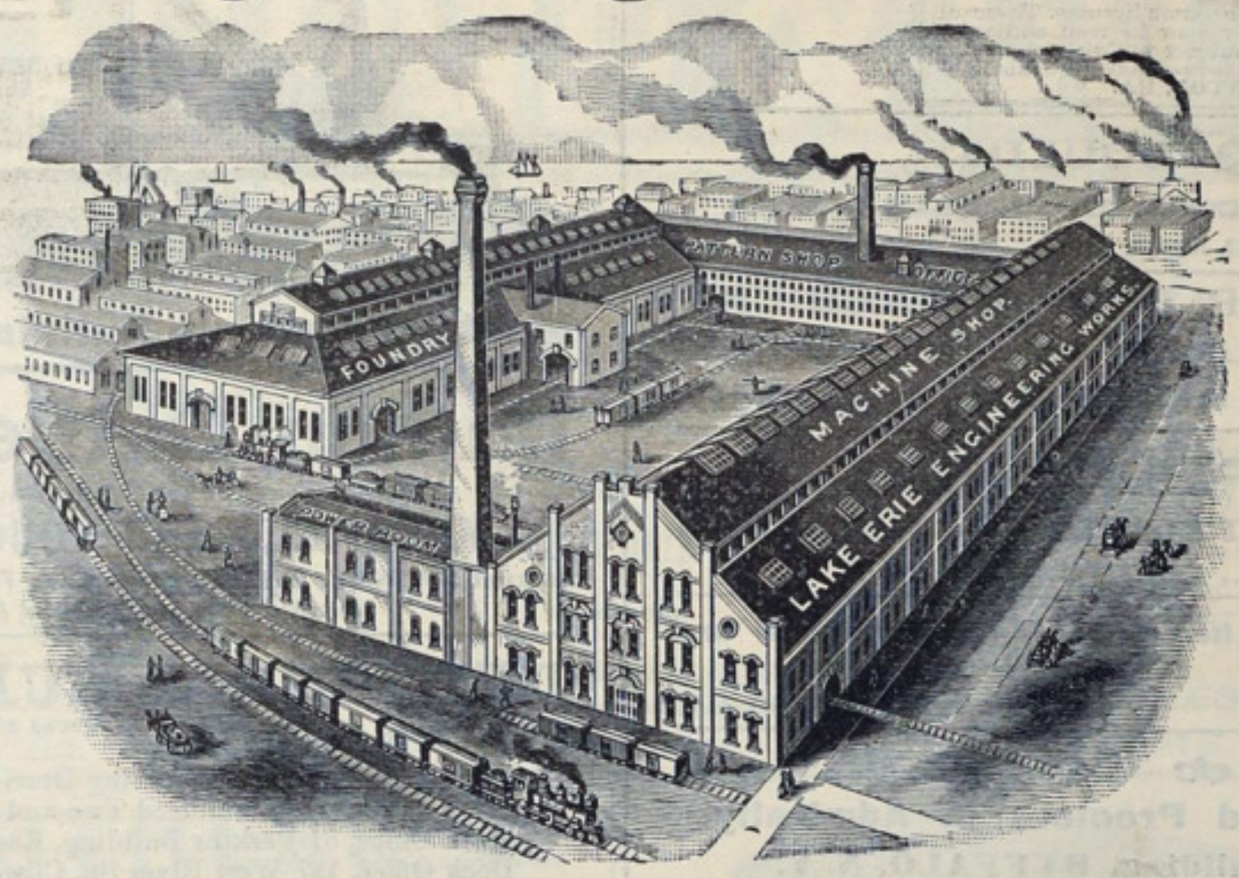

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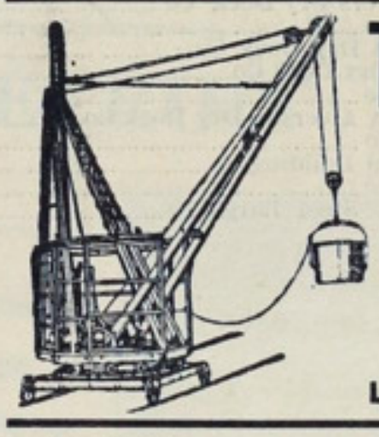

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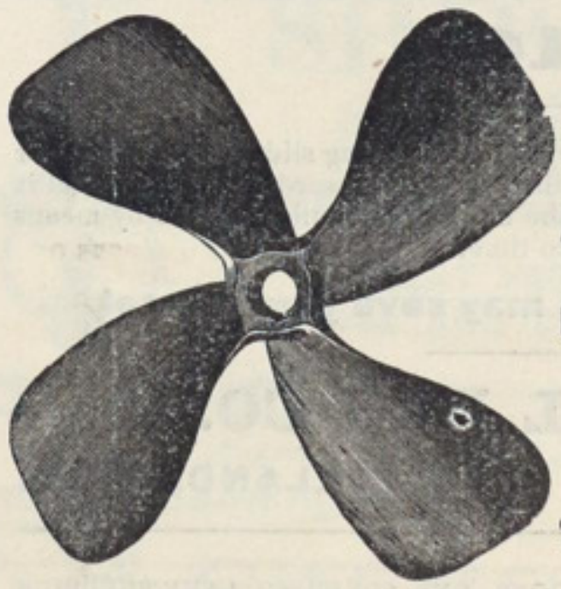

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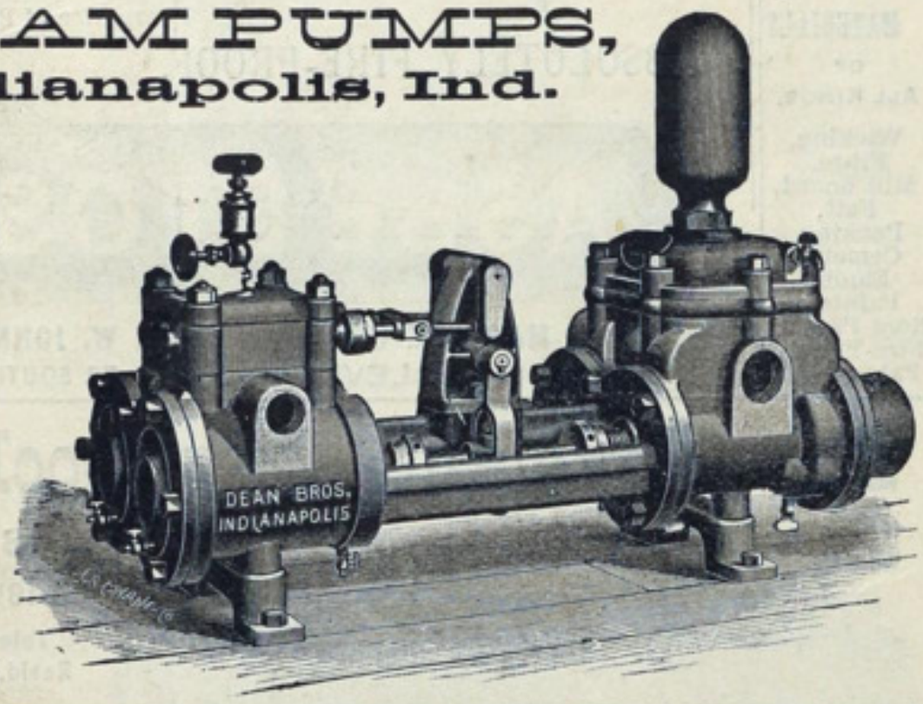

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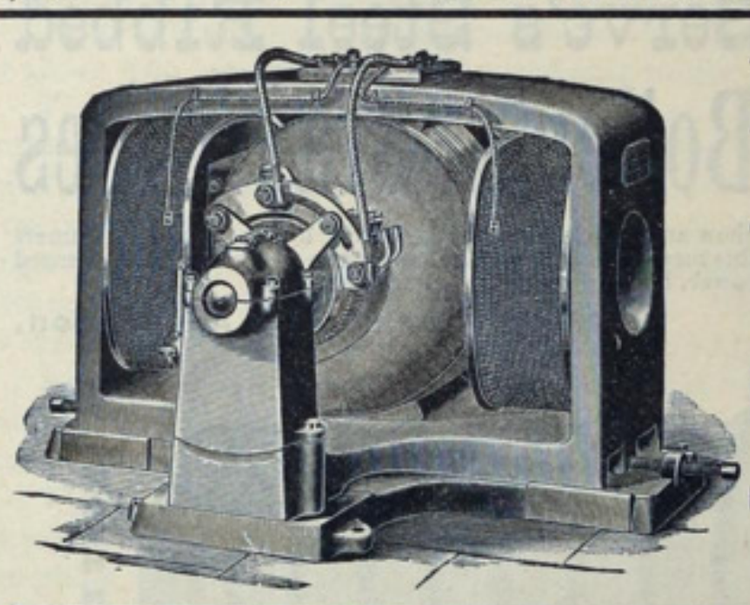

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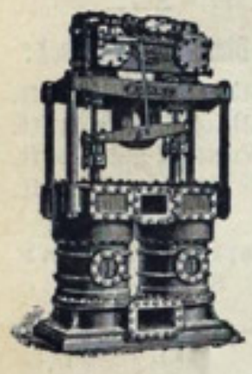

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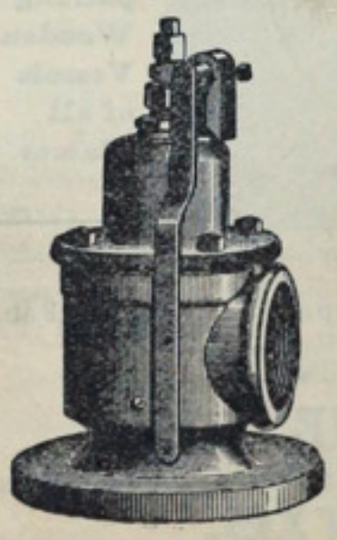

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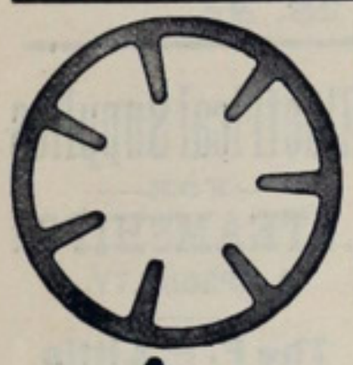

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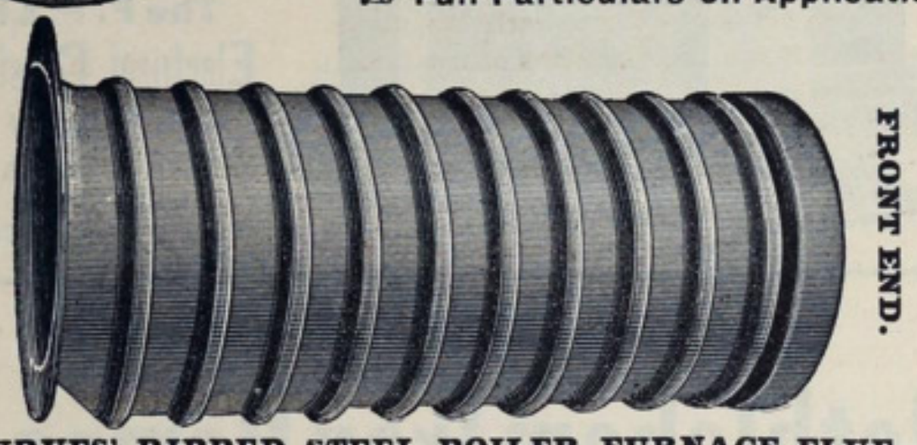

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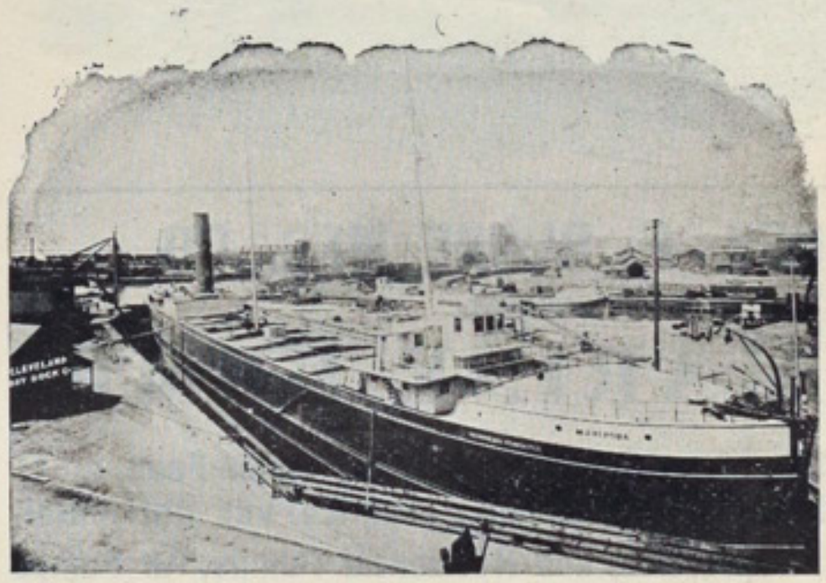

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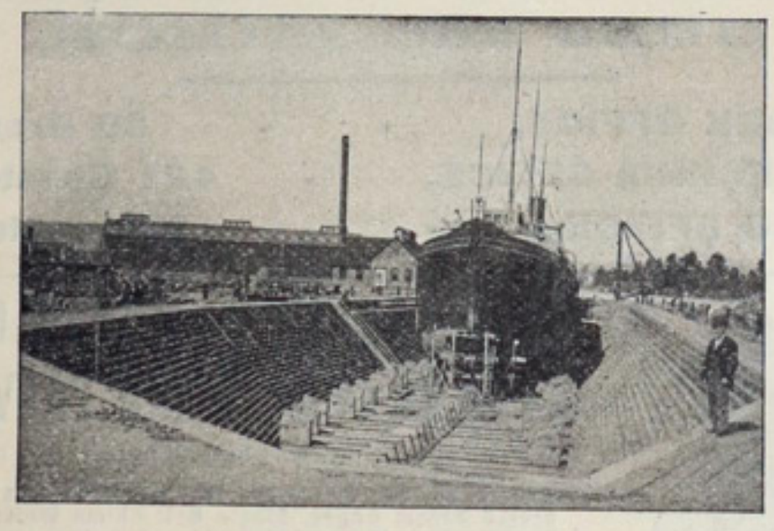

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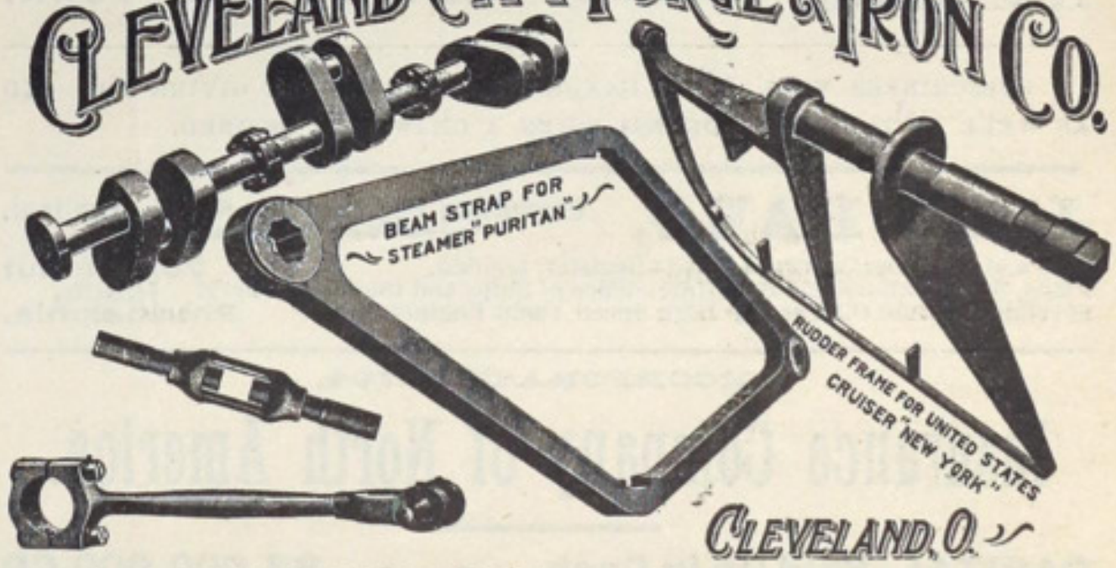

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